Theory-Practice Integration for Clinical Skills Competence among Undergraduate Nursing Students in Ireland: A Mixed Methods Study

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Declaration

I confirm that this submission consists of original work conducted by myself, except where appropriate acknowledgements to the work of others have been made, and I further confirm that no part of this submission has previously been submitted for assessment at Doctoral level.

Abstract

The nursing literature identifies an ongoing concern regarding undergraduate nursing students' competency in clinical skills and implies that current methods do not sufficiently enable undergraduate nursing students to effectively transfer and develop clinical skills competency learned in the classroom to the practice setting. The research question for this study was, 'does a practice based learning aid influence theory practice integration for clinical skills competence among undergraduate nursing students'? The educational approach incorporated a number of components including theoretical learning in the classroom, Simulated Learning (SL) in the Clinical Skills Laboratory (CSL), an Objective Structured Clinical Examination (OSCE) and finally, the use of a practice based learning aid, entitled the Reflective Checklist for Clinical Skills Competence (RCCSC). The practice based learning aid conceptually synthesises reflective theory with a self-grading approach, using a competency scale and a criterion-based clinical skills checklist.

A mixed-methods approach incorporating an explanatory sequential design was used for the study. Data was collated at four stages over an eight-month period and included clinical skills competency level data generated from the OSCE, the practice based learning aid and from the researcher's observations of students at the end of their clinical placement. Qualitative data was generated from the practice based learning aid in the form of written reflective comments. Further data was collated on completion of the clinical placement and included an evaluative questionnaire, the findings of which were further explored using qualitative data from a focus group.

The findings included an improvement in clinical skills competency levels recorded at the end of clinical placement when compared to competency levels recorded at the beginning of clinical placement ($p \leq 0.05$). The educational approach used and specifically the integration of a practice based learning aid, was identified by students as a key factor in developing and improving their clinical skills competency levels during clinical placement. Three key themes emerged from the qualitative analysis and included factors identified as pre-requisites for learning, factors that were conducive to learning and factors that were unconducive. These themes provided a deeper understanding of the students' learning experience and support the use of the educational approach employed in the study. Whilst the study is limited in context to one cohort of students the findings from both data sets increase our understanding of how students develop competency in clinical skills.

The study concludes that the educational approach employed benefited theory-practice integration by enabling students to transfer learning from the simulated setting to clinical practice and improve their clinical skills competency. The study has particular relevance and implications for nurse educators and practitioners seeking teaching and learning methods to enhance clinical skills competency transfer and transition among undergraduate nursing students. This educational approach could also be adapted by other health care professionals to enhance theory practice integration and skills competency.

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Glossary of Abbreviations and Terms

An Bord Altranais

Also known as the Nursing and Midwifery Board of Ireland (NMBI) and represents the independent, statutory organisation which regulates the nursing and midwifery professions in Ireland.

Clinical Skills Laboratory (CSL)

The Clinical Skills Laboratory (CSL) is a purpose built classroom designed to replicate the real clinical setting. CSLs were developed internationally to respond to the challenge of teaching theory together with practice scenarios in nursing; they have subsequently become an essential component of nursing education. For this study students were allocated into groups of five students per one lecturer across four CSL's for each of the simulated learning classes.

Clinical Skills Structured Observation Record

This is the observation record developed for use in the OSCE and in the practice based learning aid. It contains a list of all the criteria required to perform a clinical skill. If the criteria are performed without any hesitation a tick is placed in the 'performed competently' box. If there is some hesitation a tick is placed in the 'performed but not fully competent' box and if not performed or performed incompetently the observer places a tick in the 'not performed or incompetent' box. It also contains a competency grading scale to determine the level of overall competence for their performance of the clinical skill. A detailed discussion is provided in section 3.6.1.

Competency Grading Scale

The competency grading scale uses a Likert-type scale and was designed to provide an objective assessment of the student's competency level indicating how well each of the clinical skills was performed. It includes 'not competent', 'partially competent', 'competent' and 'fully component' levels. Level descriptors are provided and are linked to Benner's (1984) Stages of Clinical Competence. A detailed discussion of the competency scale is provided section 3.6.1.

Educational Approach

This is the educational approach implemented in this study with the purpose to explore its influence on clinical skills competency transition among the study participants. It was based on the conceptual framework developed from the literature review and incorporates a number of components beginning with teaching clinical skills theory in the classroom setting. Using the lecture format these classroom based teaching sessions would provide students with the underlying theory, rationale and evidence base related to each of the clinical skills. The second component relates to simulated learning (SL) followed by an Objective Structured Clinical Examination (OSCE) and finally, the use of a practice based learning aid, entitled the Reflective Checklist for Clinical Skills Competence (RCCSC). An explanation of each of these is provided separately.

OSCE: Objective Structured Clinical Examination

The Objective Structured Clinical Examination (OSCE) is a process used in a simulated setting to assess competence in clinical skills. The components of competence are assessed in a well-planned or structured way, with attention being paid to objectivity (Harden, 1988). The OSCE requires each student to demonstrate specific skills and behaviours in a simulated environment. It typically consists of a circuit or series of short assessment tasks (stations), each of which is assessed by an examiner using a predetermined, objective marking scheme. Six stations were designed for the skills assessed in this study and a clinical skills-structured observation record was developed and used in this study to provide an objective marking scheme. Further details of the OSCE process used in this study are provided in section 3.8.1.

Reflective Checklist for Clinical Skills Competence (RCCSC)

This is the name given to the practice based learning aid component of the educational approach implemented in this study. It was conceptually informed by the literature and was designed to be used in the practice setting by undergraduate students. It synthesises the process of reflection along with a clinical skills checklist and self- grading competency scale with the aim to promote the transfer and development of competency based learning. It is discussed in full in section 3.6.2.

Simulated Learning

Simulated learning is a popular innovative pedagogic approach encompassing a range of delivery methods and modes including low-fidelity basic simulators such as a simulated wound site, high-fidelity interactive manikins with life-like qualities, role play, case studies and virtual online environments. Learners are exposed to 'real-life' scenarios in a safe environment where they can practise skills, receive feedback from facilitators, fellow students, and with the use of high-fidelity simulators; can also learn from patient response and outcomes. Through the process of practice and feedback students can be helped to develop in both confidence and competence prior to delivering care in real practice settings.

Chapter 1: Introduction to the Study

Introduction

This chapter presents the introduction, rationale, background, context and justification for the study. The research question and subsequent study aims and objectives provide the goal of the study and an outline of the thesis. The research question identified for the study asks, 'Does a practice based learning aid influence theory practice integration for clinical skills competence among undergraduate nursing students'? The study therefore sought to explore how an educational approach influenced the transfer and transition in undergraduate nursing students' clinical skills competency. The concept of competence provides a background to the study and is discussed in terms of how it is defined within the profession of nursing. The theory-practice gap that exists between competence learned in the classroom and competence within the realms of clinical practice is identified as a key concern for the profession. Gaps in the evidence base supporting current teaching methods are discussed. A key focus is on the exploration of methods to enhance learning transfer and the transition of competency. The problem identified is that currently there is no singular educational approach that assists undergraduate nurses in the retention and transfer of clinical skills competency from the theoretical to the practice setting. An argument is presented regarding the need for a structure and process for developing and promoting the transition of clinical competency from novice to advanced beginner and beyond. The proposed educational approach is underpinned by a conceptual framework drawn from the professional literature and integrates theoretical and simulated learning with a practice based learning aid as a means to narrowing this gap. The mixed-methods design allowed for competency levels among the participants to be identified before and after the intervention and provided a means to explore the experiences of the participants as they progress through the proposed structure and process. The importance and relevance of the study to the profession of nursing and the wider fields of education are critically discussed. Finally, an organisational outline of the thesis is provided, which gives a précis of each chapter.

1.1 Background to the Study

Key works such as that by McCelland (1973), Dreyfus and Dreyfus (1980), Benner (1984), Eraut (1994, 2004) and Gonzi (1994) have long been discussed in trying to define professional competence and competency. The attributes of competence generally include some aspect of knowledge, skills and attitude (Bloom et al, 1956) and, within the profession of nursing, are seen as essential in the development of competency for clinical practice and safe patient care (Cant et al, 2013; Yanhua and Watson, 2011, Watson et al, 2002). The nursing literature continues to raise concern regarding both the retention of the knowledge and skills acquired by undergraduate nurses (Meechan et al, 2011), and the standard of proficiency in clinical skills amongst newly graduated nurses (Borneuf and Haigh, 2010). The principles of competence and competency are deeply rooted in measuring how Registered Nurses acquire and perform clinical skills effectively in practice (Garside and Nhemachena, 2013). Studies have provided evidence of skills acquisition through current education models including Cardio-Pulmonary Resuscitation (CPR) skills (Oermann et al, 2014), Intramuscular (IM) Injection Technique (Grierson et al, 2012), Blood Pressure Monitoring and Recording (Ballard et al, 2012) and Hand Washing (Bloomfield et al, 2010). However, there remains a gap in the evidence base regarding the transfer of student learning gained in the classroom to clinical practice (Cant et al, 2013).

In an attempt to address the theory-practice gap quantitative studies have examined a range of interventions to assist in the transfer of learning from the classroom to clinical practice. These include deliberate practice (Oermann et al, 2011), additional skills based training (Ballard et al, 2012; Ackerman, 2009), computer assisted learning (CAL) (Oermann et al, 2014; Bloomfield et al, 2010) and observational practice (Grierson et al, 2012). Such interventions can, however, be costly and the studies (reviewed in section 2.2) report varied rates of success relating to the retention of clinical skills competence and provide limited insight into students' learning experiences.

Simulated learning has emerged as an alternative teaching method to assist students in acquiring clinical skills because it replicates a real life situation in a

simulated environment (Decker et al, 2008). There is a trend in nursing education to use an Objective Structured Clinical Examination (OSCE) to assess and examine clinical competence (Meechan et al, 2012) within this simulated setting. OSCE was originally designed for the medical profession (Harden and Gleeson, 1979) but has been modified and applied in nursing education, providing a means to assess competence in a simulated environment without posing a risk to patient safety (Cant et al, 2013). Findings from a number of studies using various research designs including qualitative (Morgan, 2006; Houghton et al, 2012a), quantitative (Nevin, 2014) and mixed methods (McCaughey and Traynor, 2010; Hope et al, 2011), provide positive evaluations from students' and educators of the OSCE and the use of simulation as a teaching methodology. However the evaluations are often based on the subjective opinion of study participants rather than objective measurement reporting the effect of such an approach on the successful transfer of essential knowledge, skills and attitudes to clinical practice in the case of undergraduate nursing students (Edgescombe et al, 2013).

A review of the educational and methodological literature suggests that there are weaknesses within current student learning methods to transfer student learning to student competency (Cant et al, 2013). Methods reported in the literature thus far either were designed to facilitate reflective learning around simulation exercises rather than the transfer of learning to clinical practice (Jones and Alnier, 2009; Meechan et al, 2011), or a consisted of a 'cross-off' list of skills that students could attain by the end of their medical studies (Barts and the London Queen Marys School of Medicine and Dentistry, 2004). This study attempts to provide a theoretical foundation for a methodological approach to the transfer of learning. Based on a conceptual framework underpinned by constructivist (Vygotsky, 1978) and adult learning theories (Knowles, 1984), and including experiential (Kolb, 1984) and reflective learning (Schön, 1987), an educational approach was developed and implemented to address the deficit in the evidence base. This educational approach integrated theoretical learning, simulated leaning, the use of OSCE and a purposively developed practice based learning aid known as the Reflective Checklist for Clinical Skills Competence (RCCSC).

1.2 Purpose of the Study

The goal of the study was to explore how an educational approach influenced the transfer and transition of clinical skills competency to the practice setting of nursing for undergraduate nursing students. A sample from one cohort of first year undergraduate nursing students (n=27) on a full-time four year programme at a third level college in Ireland were recruited for the study. Upon successful completion of their degree, the students are eligible to register in the General Division of the Register of Nurses maintained by the Irish Nursing Board (An Bord Altranais). The aim of the general nursing programme is to provide students with the necessary knowledge, skills and attitudes, identified as the key elements of competence, to become confident, analytical and reflective practitioners (An Bord Altranais, 2005). Within the college where the study was situated the researcher was responsible, as module leader, for teaching and assessing the application of nursing theory and practice in order that students acquire the necessary competency in clinical skills, an essential prerequisite for registration as a nurse (An Bord Altranais, 2013). The appropriateness of teaching methods for the successful transfer of competence to clinical practice is the subject of an ongoing and contentious debate in the nursing literature (Meechan et al, 2011). Therefore the exploration and examination of an educational approach designed to augment students' transfer of learning to the practice setting is considered as a valuable contribution to nursing education, practice and research.

An explanatory sequential design was used to address the research question and meet the aim and the objectives (Creswell and Plano Clark, 2011). The purpose was to firstly explore how the theoretical and simulated teaching methods employed influenced students' clinical skills competency levels. This involved the collection of quantitative data prior to commencing clinical placement, using an Objective Structured Clinical examination (OSCE). The practice based learning aid was designed to enhance the transfer of this learning to clinical placement and generated both quantitative and qualitative data. Along with field observations by the researcher to identify competency levels at the end of clinical placement the quantitative data provided a means to compare competency levels at various stages. By providing an indication of the students' transition along the competency scale conclusions could be drawn as to the success of the

educational approach taken. Additionally, analysis of the written reflective comments from clinical practice and the responses to the evaluative questionnaire and the focus group provide further quantitative and qualitative data to corroborate and validate initial findings and provide insight to the students' learning experiences. The mixed methods approach to analysis allowed the development of a tentative model of competency transition based on the integrating and synthesis of both the qualitative and quantitative data, which would not have been possible using either method alone (Teddlie and Tashakkori, 2006).

Conceptually, this study contributes to three important areas within nursing. It contributes to education by enhancing our understanding of the learning processes and experiences of student nurses in developing and transferring clinical competency to the practice setting. It contributes to practice by evaluating how the education approach including simulation, OSCE and the Reflective Checklist for Clinical Skills Competence (RCCSC), influenced nursing students to bridge the theory-practice gap and finally the research design could be replicated in similar research studies. Contextually the design has utility and applicability in advancing future research in this important area of the transfer of nursing competence to the clinical setting.

1.3 Organisation of the Thesis

This thesis is divided into seven chapters, each of which has a specific purpose in guiding the reader through the research process, defending the approach taken and presenting and analysing the research findings. The review of the literature in Chapter 2 provides a critical discussion of competence as a concept and examines current teaching methods and approaches used in nursing education for developing competency in clinical skills. The merits of simulation-based teaching and training and reflective practice are discussed and the review raises critical evidence-based concerns regarding the effectiveness of current methods in bridging the theory-practice gap. The challenges for nurse educators in ensuring the successful acquisition, retention and transfer of competency in clinical skills from the classroom to the practice setting are debated. The review

describes a gap found in the literature regarding the absence of a clear educational approach integrating a practice based learning aid that augments the retention and transfer of knowledge from the classroom to the clinical practice placement. Based on the literature review, it is argued that the successful transfer of learning to the clinical practice setting requires learning through simulation in the safety of the Clinical Skills Laboratory (CSL). Clinical skills acquisition is determined by the use of an OSCE and maintained by a introducing a practice based learning aid that synthesises reflection and a self-recorded clinical skills competency scale during clinical placement.

Chapter 3 provides details of the research goal and the methodological approach used for conducting this study. It discusses the aim, research question and the research objectives relating both to the need for developing a teaching and learning approach for clinical skills theory-practice integration among undergraduate nursing students and to the exploration of the learning experiences of the students, specifically those related to the transfer and development of clinical skills competency. The philosophical debate defending and justifying the rationale for the pragmatic approach adopted in developing the mixed-methods research design to answer the research question is provided. The chapter also provides a critical discussion of the research methods, data collection tools and data analysis methods used in the mixed methods design; the operational choices made to maintain scientific rigour are defended, ensuring the study is both ethically sound and robust. The resultant research methodology provided a systematic and rigorous approach to measuring the effectiveness of the educational approach implemented, and specifically the RCCSC as a learning aid for the transfer of clinical skills to the practice setting of nursing. It further allowed for a deeper understanding of the learning processes and experiences of undergraduate student nurses when developing and maintaining clinical competence in the professional practice setting.

The findings from the quantitative strands of the study are presented and illustrated in Chapter 4; these include pre-test and post-test data which provide an indication of the students' clinical skills competency levels before and after using the intervention. The results from the post-test evaluative questionnaire are

also presented and both analytical and descriptive statistics are provided. Chapter 5 presents the findings from the qualitative strand phase including the focus group and the findings from the written reflective comments.

Chapter 6 integrates and provides a critical discussion of the findings from both the quantitative and qualitative data analysis, together with the findings from the literature review. The implications of the study and its contribution to nursing education, practice and research are critically discussed. The final section in this chapter discusses the dissemination strategy and the limitations of the study. Finally, Chapter 7 examines the main conclusions that have been drawn from this study and synthesises the findings into a resultant tentative model for competency transition among undergraduate nursing students.

Chapter 2: Literature Review

Introduction

Competency as a concept continues to stimulate debate and discussion among practice disciplines (Fernandez et al, 2012) and remains a key topic of interest in health care disciplines such as nursing (Yanhua and Watson, 2012). This chapter begins by examining the professional literature debating how competence is defined and focuses specifically on clinical skills competency for nursing practice. Seminal work such as that by Dreyfus and Dreyfus (1980), and Benner (1984) are explored along with scholarly papers and publications from professional bodies to reach an operational definition specifically in relation to identifying clinical skills competency and proficiency among undergraduate nursing students (section 2.1). The identified gap between education and practice is also explored and the empirical evidence as to how best to narrow this gap is considered. The seminal work of Dewey (1933), Schon (1983) and Kolb (1984) amongst others is explored, along with empirical evidence related to simulated learning (section 2.2) and reflection (section 2.3). A gap in the literature is identified regarding competency development and transfer from the simulated environment to the practice setting. Finally, a conceptual framework based on the literature review is developed, which underpins the educational approach implemented in this study exploring competency transition among undergraduate nursing students.

A comprehensive search of the relevant research literature in the English language was made using the following databases: CINAHL Plus, OVID, Medline, Pub Med, Science Direct, ERIC, PsycInfo, and EThOS. Key words in the title included; Clinical competence, and/or competency, nurses, nursing, clinical competence/competency, nursing students/undergraduate nursing and or clinical assessment. These were expanded to include ‘Simulation’, ‘OSCE’, ‘Skills Retention’ and ‘Transfer of Learning’ as key terms identified from the initial retrieval. The following inclusion/exclusion criteria were used:

Inclusion criteria

The main focus of the research was clinical competence or competency,

The study sample was from students and new graduates from a General Nursing programme

The methodology included literature review, experimental studies, surveys, qualitative and mixed method studies.

Exclusion criteria:

Area of competence not clinical e.g. cultural competence

Study related to nursing management

Sample was not general nursing students.

Key seminal works identified from this literature were also retrieved along with relevant scholarly papers, unpublished thesis' and publications from recognised professional organisations. Literature from allied professions including medicine (Fernandez et al, 2012; Brannick et al, 2011; Chesser et al, 2009;), dietetics (Hawker et al, 2010; Pender and de Looy, 2004), pharmacology (Hastings et al, 2010) and physiotherapy (Wessell et al, 2003) were also reviewed and although informed the research strategy they were not included in the critical review provided due to the focus being on the researchers area of professional practice in nursing education and the limitations in the word count.. A total of twenty six core empirical studies were selected based on meeting the inclusion criteria and their relevance to the current study. Appendix 1 provides a table listing in alphabetical order the key empirical studies included in the review and includes the author and title of each study, the study participants, the research methodology and a summary of the key findings and conclusions. The thirteen quantitative studies selected are shaded brown (Appendix 1) and include three Randomised Control Trials (RCT's), five Quasi-experimental designs, two pre-test-post-test designs and three survey designs. The seven qualitative studies selected are shaded green (Appendix 1) and the eleven studies using a mixed methods design are shaded blue (Appendix 1).

2.1 An Understanding of Competence and Competency

This section of the literature review is not another attempt to define competence or competency rather it provides a background to the concept as it applies to this study. Definitions identified in the literature are examined in order to reach an operational understanding of competence and competency within the context of clinical skills performance among undergraduate nursing students. At its simplest, competence can be viewed as something that a person should be able to do in a particular job. Gonzi, (1994) suggests that this specification of competence can be equated with tasks or skills so that there can be no disagreement as to what constitutes satisfactory performance. This approach to competence however is quite limited, in that the concern is more with what needs to be done in order to perform rather than with learning and knowledge. McCelland (1973) used the term 'competency' rather than 'competence' and viewed it more as a person's underlying characteristic that enables them to deliver superior performance in a given job, role or situation. McCelland's (1973) work is often regarded as the beginning of modern thinking related to competency based education and training (Manley and Garbett, 2000). His work stemmed from the belief that traditional academic examinations were not true predictors of job performance and he wanted to replace the current intelligence and aptitude tests with competencies that would better predict success. McCelland (1973) further believed that this would in turn reduce bias against minority groups including women.

This work was further developed with other psychologists through the McBer consultancy group (now part of the Hay Group). The Hay Group (2003) view competency as relating to the ability to apply knowledge, skills, abilities, behaviours and personal characteristics in the successful performance of work. They identify personal characteristics and include necessary cognitive, psychomotor and attitudinal attributes to perform the job (Hay Group, 2003). These three key attributes are similar to the domains of learning, often referred to as Bloom's Taxonomy, which include the cognitive domain relating to mental skills and knowledge, the psychomotor domain relating to manual or physical skills, and the affective domain relating to feelings and emotions (Bloom et al, 1956). These domains are also reflected in Gonczi's (1994) seminal work on a

competency-based approach to the education and training of professionals. Gonczi (1994) argued that a competency-based approach is potentially more valid than traditional approaches in that it allows any profession to assess the capacity of the professional to integrate knowledge, values, attitudes and skills in the world of practice.

Within the practice of nursing, professional competence is synonymous with Benner's (1984) seminal conceptual framework regarding the performance characteristics of nurses with different levels of clinical competency. Benner (1984) originally set out to discover and describe the knowledge embedded in nursing practice. She used Dreyfus' (Dreyfus and Dreyfus, 1980) five levels of competency to describe skill acquisition in clinical nursing practice. Benner's (1984) model posited that individuals pass through five levels of proficiency while acquiring and developing skills, namely: novice/beginner, advanced beginner, competent, proficient and expert. Appendix 2 provides a table identifying each of Benner's (1984) competence levels and includes a level descriptor for each.

Benner (1984) makes a clear differentiation between practical and theoretical knowledge and recognises the importance of experiential learning. In a later publication on clinical wisdom, Benner et al (2009) suggested that the concept of novice-to-expert in nursing accentuates the process of learning from experience and highlights the importance of tacit knowledge and intuition as crucial features of professional competence, which occur mainly during practicum. To learn from experience the learner needs to reflect on that experience and personal reflection is considered integral to the process of knowing and becoming a competent practitioner (Bonis, 2009). The literature regarding when and how nurses reach the competence levels as theorised by Benner (1984) remains inconclusive. Jasper (2006), for example, suggests that the student nurse would begin at the novice practitioner level, moving to the competent practitioner level at the point of qualification; this however contradicts Benner's (1984) description of the typical competent practitioner having two to three years' experience in practice. Altman (2007) argued that the move from novice to expert is characterised by the transition from explicit rule-governed behaviour to intuitive contextually-determinant behaviour and not every nurse will reach the level of expert.

Further evidence of the ambiguous nature of competence can be found in studies by both Rischel et al (2008) and Martin and Wilson (2011). For example Rischel et al (2008) used a structured observation schedule and were unable to empirically verify Benner's (1984) five-stage developmental competence model. Four nurses were observed on 12 occasions and they found that each nurse had a unique pattern of practice which did not correspond to the level of competence expected in relation to their length of experience as a nurse (Rischel et al 2008). Contrary to the expectations of Benner (2004), nurses' competence appeared to be situational rather than related to levels in the developmental model; in some observed variables inexperienced nurses acted as experts, while experienced nurses acted as advanced beginners (Benner, 2004).

Martin and Wilson's (2011) study examined the lived experiences of seven newly registered nurses in their first year of practice in one acute hospital setting in North America. They identified that the newly qualified nurses in their study were at the novice or advanced beginner stage. Themes relating to the newly qualified nurse adapting to the culture of nursing and developing their professional responsibilities were identified. In fact stories of novice nurses struggling with basic tasks led them to conclude that it would be impossible for a new graduate to function at a competent level (Martin and Wilson, 2011) and relates more to Benner's (1984) Advanced Beginner level (Appendix 2). This finding is in contrast to Rischel et al's (2008) earlier study, which found that new graduates with less than one year's experience were at times demonstrating competence at the expert level. Both studies (Rischel et al, 2008; Martin and Wilson, 2011) had small samples and have to be taken in the context in which the data was collected. Martin and Wilson (2011) sampled new graduates in a variety of medical and surgical units in one hospital setting while Rischel et al (2008) specifically observed new graduates undertaking an admission assessment in one setting. It is argued that the skills in these settings were less technical than those related to Benner's (1984) work, which focused on nurses in the context of Intensive Care Units. The current study exploring the competency of undergraduate nursing students argues that competence is related more to the individual and the contextual factors in which the task is performed rather than the individual's length of experience. Whilst there are clear limitations to both the studies from

Martin and Wilson (2011) and Rischel et al (2008), specifically in regard to sample size and subsequent generalizability of the findings, their key relevance to this research relates to the competency level of the undergraduate student nurse.

It is acknowledged that nurses working in the modern healthcare setting are faced with a highly complex clinical environment that is constantly undergoing advancement and change; moreover they have to deal with high levels of patient dependency and acuity (Higgins et al, 2010). Within this complex caring environment there is an expectation that the nurse will be competent in their duties (Calman, 2006). In the context of this study it is argued that as a novice, the undergraduate student should at least be competent within their scope of practice. This is based on the individual, their previous learning experience and their exposure to varying clinical scenarios.

Within the nursing profession, however, there remains no universally accepted definition of competence (Bradshaw, 2000; Bradshaw and Merriman, 2008; Smith, 2012). Those who have attempted to analyse the concept have found it difficult to define (Garside and Nhemachena, 2013). Yanhua and Watson (2011) argue that within nursing, a definition of competence still "...lacks consensus, remains obscure and contradictory, especially, the differentiation between competence and competency" (p. 832).

Published concept analyses were reviewed in an attempt to reach an understanding of how competence is defined. From the papers reviewed there was a general agreement that competence within nursing includes the key attributes of knowledge, skills and attitudes. For example, Scott-Tilley's (2008) concept analysis highlighted that nursing students would be required to demonstrate integration and mastery of knowledge and the ability to apply that knowledge, interpersonal skills, decision making and psychomotor skills, expected for the practice role. Axley (2008), a US professor in nursing, adds to this by identifying a further category of competencies as *core competencies.* These are described as referring specifically to a group or compilation of skills or procedures requiring the ability of a person to successfully or competently perform the required action or actions (Axley, 2008). The elements included (a)

'*Knowledge'*; (b) *'Actions',* which includes ability and skills; (c) *'Professional Standards'*; (d) *'Internal Regulation'* including accountability, motivation and self-regulation; and (e) *'Dynamic State'*, which includes consistent improvement (Axley, 2008, p. 218). Valloze (2009) identified the attributes of competence within nursing as: *Professional Role Model, Critical Thinker, Expected Practice, Building Knowledge and Skills,* and being able to '*demonstrate appropriate action'* and '*ability to apply norms to a given situation'* (Valloze, 2009 p. 116). Smith (2012) further identifies the attributes of competence as '*integrating knowledge into practice, experience, critical thinking, proficient skills, caring, communication, environment, motivation,* and *professionalism'* (Smith 2012, p. 181). In contrast, Fernandez et al (2012) reviewed the medical literature published between 1946 and 2011 to determine what competence means to the medical profession. They concluded that, in addition to knowledge and skills, other components of competence varied and were broadly categorised as attitudes, abilities, judgement, values and personal or character attributes.

This thesis argues that the very existence of so many definitions makes it unlikely that that there will ever be a universally acceptable definition of competence; any definition however should include a combination and integration of performance and capability and it is further argued that, for nursing students to be competent, there needs to be a blend of requisite knowledge, the necessary skills and professional experience. The literature so far has argued that at a minimum there are three key elements of competence, namely knowledge, skills, and attitude and these elements can be found in the definitions provided by nursing regulatory organisations.

In Ireland, for example, the Irish Nursing Board (An Bord Altranais) recognises competence as being a complex and multidimensional phenomenon and defined it as, *'the ability of the Registered Nurse to practice safely and effectively, fulfilling his/her professional responsibility within his/her scope of practice*'(An Bord Altranais, 2005, p. 12). This definition recognises safe, responsible, accountable and effective practice as key abilities of the competent nurse. Similarly, the UK Nursing and Midwifery Council defines competence as '*the overarching set of knowledge, skills and attitudes required to practise safely and effectively without*

direct supervision' (NMC, 2010, p. 145). In this definition the 'ability' required by the Irish Board (An Bord Altranais, 2005) is replaced by the attainment of the necessary knowledge, skills and attitudes needed for safe and effective nursing practice (NMC, 2010). Nursing boards in Australia, (Nursing and Midwifery Board of Australia, 2013), Canada (Colleges of Nurses of Ontario, 2008) and New Zealand (Nursing Council of New Zealand, 2012) provide similar definitions. Specifically in the last decade in Ireland, requirements and standards for nursing education have focused on what constitutes competence and the attainment of such skills. Indeed the national regulatory bodies have identified the core content required for the training syllabi of nurses and midwives in order to ensure public confidence in nursing as a profession as well as maintaining high standards and on-going development in the profession of nursing (Higgins et al, 2010). Nationally and internationally, therefore, nursing regulatory bodies recognise competence as the ability of the registered nurse to practice safely and effectively, and acknowledge that knowledge, skills and attitudes are the essential elements of competence.

Undoubtedly the most holistic perspective on the elements of competency is a definition that requires the competent professional to combine the key elements of competence identified as knowledge, skills and attitudes (Gonzi, 1994). This holistic definition views the concept as the bringing together of a range of general attributes such as ways of knowing, accepting that undergraduate nursing students are novices in new situations, and applying knowledge, skills and attitudes in such a way that these specifically address the needs of the practitioner. The acceptance of a holistic approach to competence could help in the development of more precise competence standards and assessment instruments in nursing practice and care (Yanhua and Watson, 2011). The implication for professional nursing education is that competence is the selection of concepts that focus on the mastery of a set of components, namely cognitive, affective and psychomotor skills and abilities (Hay Group, 2003). Competence is therefore more than a behaviourist concept or, indeed, generic in nature as identified by the aforementioned authors. The key elements of knowledge, skills, psychomotor skills and attitudinal or cognitive skills as a holistic perspective on the concept of competence are at the core of the development of a competent

nursing practitioner. In this thesis the elements of competence are identified as being formed from the cognitive, affective and psychomotor constituents of competence which are of relevance to all five domains of practice, as outlined by the nursing board (An Bord Altranais, 2005). Based on original work of Bloom et al (1956) the cognitive domain contains mental and knowledge skills, including concentration and goal setting. The affective domain refers to interpersonal and intrapersonal skills, incorporating communication and reflective skills. The final domain refers to the manual and physical skills required for competence; all three however contain a cognitive element and are linked directly to form the elements of competence. These elements inform the conceptual framework underpinning the current study and reflect the official definition of competence as provided by the Irish Nursing Board (An Bord Altranais, 2005). Having defined competence, the next section explores how educators facilitate the acquisition of competence in clinical skills by undergraduate nursing students, using various teaching and learning strategies.

2.1.1 Competence development and simulation

Simulation has gained increasing popularity as a teaching and learning methodology within healthcare education, and scholars within the nursing profession argue that it is an important feature in clinical skills teaching (Decker et al, 2008; Park et al, 2012). As a teaching method, simulation allows for multiple learning objectives to be taught in a realistic clinical environment without causing harm to patients and can provide 'micro-worlds' whereby important interactions between patients, doctors, nurses and other health professionals can be highlighted, illustrated, explained and replayed (Valler-Jones et al, 2011). The concept of simulation mimicking real life is one of the major strengths of this type of learning in health education and it allows the nursing student to develop their assessment, critical thinking and decision-making skills in a safe and supportive environment (Medley and Horne, 2005). Park et al (2012) argue that simulation, as a pedagogical framework for nursing students, replicates a real life healthcare setting in a simulated environment, where students can rehearse their clinical skills while surrounded by artefacts from the clinical environment and thus it can assist students in the acquisition of clinical skills. As a teaching methodology it also allows for the assessment and evaluation of the student's clinical skills

performance in a context where, if the student demonstrates a mistake, inaccurate patient assessment or slow clinical decision making, patient health is not affected and the student has the opportunity to learn from the experience (Edgescombe et al, 2013). However, there are disadvantages; for example role playing is artificial (Kaakineen and Arwood, 2009), and at times can be interpreted by the participants as some sort of game and therefore not taken seriously (Berragan, 2011) and it cannot portray the complexity of real life clinical practice (Handley and Dodge, 2013). Furthermore, published systematic reviews of simulation literature by Edgecombe et al (2013), Rutherford-Hemming (2012), Sanford (2010) and Kaakinen and Arwood (2009) continue to note a paucity of research to support the underpinning learning theory for simulation as a methodology within nursing education.

Kaakinen and Arwood (2009), for example, set out to determine how learning theory was used to design and assess learning that occurs in simulations. A systematic review of the nursing simulation literature between 2000 and 2007 found that of the 120 articles reviewed only 16 referenced learning or developmental theory as a basis for designing the simulation and only two considered learning as a cognitive task. Sanford's (2010) focused review concluded that although simulation has found a place in nursing education there is a void of concrete research evidence to support its use as a learning modality. Later reviews by Ricketts (2011) and Edgecombe et al (2013), as part of a national project to provide guidelines to enhance teaching and learning quality in simulation in New Zealand, reaffirmed the continued dearth in the literature. While research and documented experience with using simulation in nursing education is increasing there is limited research pertaining to evidence-based principles or theory on how learning that occurs using simulation is transferred to the practice setting.

Educators, however, would support the contention that all learning has to be underpinned by theories, for example, social constructivist theory (Vygotsky, 1978). In the skills laboratory and in real world situations interaction and collaboration are the means by which learning takes place. Social constructivism stems from the works of Vygotsky (1978) and posits that learning is constructed

in a social environment; as a theory it has ties with adult learning, where constructivist nature is manifested in transformational learning, experiential learning, situated learning and reflective practice (Rutherford-Hemming, 2012). The literature therefore raises two key issues that need to be addressed. The first relates to the lack of theory underpinning simulation as a teaching method, and the second relates to how learning through simulation is transferred into the clinical practice setting.

With regard to the learning theory underpinning simulation, Kaakinen and Arwood (2009) concluded that most nursing faculty approached simulation from a teaching paradigm rather than a learning paradigm. As a teaching methodology, simulation draws on a number of adult learning and reflection theories to explain and support how students learn from simulated experiences (Decker et al, 2008). For example, Knowles et al's (2005) theoretical perspective on adult learning posits that adult learners are self-directed, experienced, orientated and motivated to learn. Simulation as a teaching and learning approach for undergraduate nursing skills development supports the idea of constructivism as an underpinning learning theory. It can offer an environment where collaboration and participation can be practiced alongside skill acquisition and development, thus preparing the student for the real world of nursing (Berragan, 2011). This study endorses the constructivist approach to learning in the belief that knowledge is constructed when meaning is attached to an experience (Bastable, 2008; Merriam and Caffarella, 1999; Vygotsky, 1978).

The argument posed is that the learner moves from a teacher centred behaviourist approach through a more learner centred scaffolded approach, which in turn leads to the learner achieving competence through a constructivist approach to learning. This continuum can be directly related to Benner's (1984) framework of the practitioner moving through the five stages from the beginning stage of novice to expert practitioner (Appendix 2). The focus in this study is on the undergraduate nursing student whose experience reflects the progression through the earlier stages of novice-advanced beginner to competent practitioner.

Simulation as a teaching method aims to achieve specific goals related to learning or evaluation and is not intended to replace the need for learning in the clinical practice setting (Edgecombe et al, 2013). Simulation as a teaching methodology requires a Clinical Skills Laboratory (CSL). In Ireland, where the current study is situated, the nursing board (An Board Altranais, 2014b) recognises simulation as a legitimate teaching method but suggests that evidence of competence produced in a simulated setting would not be of the same high quality as that generated by normal workplace activity gained in clinical practice. Performing a psychomotor skill in the CSL setting under the guidance of an educator creates the learning opportunity to demonstrate understanding of the information and allows for error correction and opportunities for feedback (Gatti-Petito et al, 2013). However, this is still role playing and does not portray the real life situation or varied context of clinical practice (Kaakineen and Arwood, 2009). However the CSLs, in tandem with simulation, do play an important role in acquiring not only the necessary psychomotor skills required of the practitioner but also the critical and the reflective thinking skills that are crucial to the provision of competent patient care (Rutherford-Hemming, 2012). Critical examination of the benefits of the clinical skills laboratory (CSL) as a means for undergraduate nursing students to acquire the necessary knowledge, skills and attitudes for competent clinical practice is therefore essential.

A total of 11 studies were identified that specifically set out to evaluate simulation learning and the use of Clinical Skills Laboratories in undergraduate nursing education. The majority of these used a mixed-methods design (Moule et al, 2008; McCaughey and Traynor, 2010; Hope et al, 2011; Nevin et al, 2014) and argued that a mixed-methods design provides a much richer data source (McCaughey and Traynor, 2010). The other studies used either a qualitative (Morgan, 2006; Wellard and Heggen, 2010; Houghton et al, 2012a; Handley and Dodge, 2013) or quantitative (Aliner et al 2006; Meechan et al, 2011) design, as guided by the research question.

The qualitative studies provide an insight into the perceptions of students and staff regarding the benefits of simulation. For example Morgan (2006) set out to explore if the sessions taught in the clinical skills laboratory prior to the first

placement helped undergraduate nursing students in Ireland integrate theory into their first placement in clinical practice. Using a Heideggarian approach to phenomenology, Morgan (2006) interviewed six first year nursing students from one cohort. Analysis revealed that basic nursing skills taught in the CSL, which included vital signs and hygiene needs of patients, enabled the students to link theory to practice during practice placements. There is however a lack of studies examining the actual transfer of learning to the practice setting. Many findings are based on the perceptions of a small number of students and lack of objective measurement of the students' ability to link the theory to their actual clinical practice.

A larger sample was used by Houghton et al (2012a) when exploring the role of the Clinical Skills Laboratory (CSL) in preparing nursing students for the real world of practice. Using a qualitative multiple case study design they sampled 58 participants including lecturers, clinicians and nursing students across five randomly selected third level colleges in Ireland. This study focused specifically on the participant's perceptions of the teaching and assessment strategies employed. Supporting Morgan's (2006) findings, their analysis of the semi-structured interviews found that the use of CSLs provides a clear pathway to clinical practice. Similarly Handley and Dodge (2013) also found an overwhelming support from students and educators for simulated learning from their scoping exercise of four large universities in the United Kingdom to ascertain current simulation practice within nursing. Furthermore, in Wellard and Heggen's (2010) collaborative study of eight schools of nursing in Australia and two in Norway, they found that the laboratories were perceived as providing a place of safety for students to practice, as they could 'fail' without consequence. This study found that faculty members in both Australia and Norway believed that the clinical laboratories are extremely valuable in preparing students for practice placement.

A positive evaluation of simulation is also provided by the findings of mixed-methods studies. In the qualitative phase of Moule et al's (2008) study, analysis of interviews with mentors (n=6) and of open-ended questions from student evaluative questionnaires (n=62) identified an increase in students' confidence

and the ability to learn in a safe environment as key benefits and positive learning opportunities that simulation brings to the acquisition and development of clinical skills. Increased confidence and competence were also reported by the students in Meechan et al's (2011) study. This increase in confidence as a result of simulation was also identified by Handley and Dodge (2013), Houghton et al (2012a), Hope et al (2011) and Wellard and Heggen (2010). In fact McCaughey and Traynor (2010) go so far as to report an overwhelming response from the students in their survey of third year nursing students (n=93) that simulation had a positive impact on their clinical effectiveness. However this was based solely on student perceptions and arguably does not provide empirical evidence of the educational benefits.

Hope et al (2011) also highlighted the ability to apply theory to practice in a safe environment, as a key benefit of simulation. Students in their focus groups (n=35) not only enjoyed simulation as a teaching method but perceived that it helped them to improve confidence and competence prior to exposure to clinical practice. Learning in small groups within the CSL contributed to their positive learning experience. Furthermore, Brosnan et al's (2006) study of Irish nursing students (n=89) found that students perceived that they were more confident and better prepared for clinical placement following simulation training and OSCE assessment. Again, however there is a lack of empirical evidence from the research of either Hope et al (2011) or Brosnan et al (2006) that students' perceived confidence and competence is transferred to practice.

There is no guarantee that simulation will always produce an increase in confidence; in their study Aliner et al (2006) found that simulation did not have a statistically significant effect on students' perceptions of stress or confidence. A pre-test post-test design was used to determine the effects of simulation training on nursing students' clinical skills competence (n=99). However confidence levels were related to working in a highly technological environment and in fact the general feeling in both the control and experimental groups was that they did not feel confident working in such environments. The methodology did not provide any support in the form of a tool or learning aid that might assist the student to link the simulated learning to the practice setting which may help to reduce

anxiety. Furthermore, students who admitted to not being confident also admitted to being stressed in such an environment (*p=0.002*) (Aliner et al, 2006).

Within the context of undergraduate nursing education in Ireland the findings from Nevin et al's (2014) recent study add further support to the positive evaluation of simulation. Their study evaluated a problem-based simulated learning package for managing acutely ill patients. A 15-question evaluative questionnaire, found to be highly reliable using Cronbach's alpha, was distributed among the participants. Analysis found that students evaluated the simulation training as a positive contribution to developing their clinical skills, knowledge and confidence for clinical practice (n=87). The students believed that the problem-based learning package helped them to integrate theory into practice and improved their ability to reflect critically on their own performance. It could be argued that, as a teaching method, Nevin et al (2014) were using Problem-Based Learning (PBL) as an instrument for translating the constructivist philosophy into a pedagogy for learning. As such, the findings support the position within this study that students construct their own understanding and knowledge of clinical skills by experience in both the simulated and clinical environment and learn by reflecting on those experiences. However the conclusions rely on student perceptions rather than any empirical evidence demonstrating actual improvement in the student's ability.

Although subjective analysis of the participants' perceptions of the benefits of using simulation as a teaching strategy is valuable to the current discourse, it does not provide scientific evidence of the effect of simulation on practice, nor does it present an objective depiction of its advantages. The primary aim of simulation in undergraduate nursing education is to improve patient safety and to help the student nurse achieve competence, linking their theoretical knowledge with clinical practice (Ricketts, 2011).

2.1.2 The Objective Structure Clinical Examination (OSCE).

Determining competence in clinical skills is central to nursing education (Cowan et al, 2005) and competence as a concept has already been discussed (section 2.1). There is a key argument that that it is essential to provide rigorous, valid and reliable evaluation of nursing students' performance in clinical skills in order to

ensure their readiness for practice (Levett-Jones et al, 2011). Yanhua and Watson (2011) found that a range of approaches to assessing and measuring clinical skills competence among nursing students has been used in the past. Their literature review found methods that included self-assessment, reflection, direct observation in the clinical setting or simulated setting, and multi–method approaches. One of the key methods identified is the Objective Structured Clinical Examination (OSCE), first introduced into medical education in the 1970s (Harden and Gleeson, 1979). The OSCE involves the direct assessment of a variety of clinical skills within a classroom or clinical room (Cant et al, 2013). Conventionally, students rotate through a system of multiple stations simulating a clinical reality; skill performance and proficiency are assessed by an examiner using structured checklists (Jones et al, 2010). By the end of the OSCE, all students have passed through all the stations and been marked according to a precise set of criteria. Well-designed marking sheets and the appropriate briefing and preparation of examiners ensure that the overall examination is based on objective judgement (Aliner et al, 2006). Over the last decade nursing education has witnessed an increase in the use of the OSCE to assess undergraduate nursing students' competence in clinical skills (Cant et al, 2013). Studies by Aliner et al (2006), Moule et al (2008), McCaughey and Traynor (2010), Hope et al (2011) and Meechan et al (2011) have provided positive evaluation of the OSCE and empirical evidence of skill acquisition following simulation. However although skills acquisition is evident the level of competence and or proficiency is not always clearly identified and there is a lack of empirical evidence to determine the level of transfer of the knowledge and skills learned from the simulated setting to clinical practice.

Participants in Aliner et al's (2006) study, for example, favoured the use of simulation and OSCE for teaching and assessing clinical skills. The experimental group was exposed to additional scenario-based simulated training in addition to the standard training provided to the control group. Using an Objective Structure Clinical Examination (OSCE) nursing students' clinical skills competence levels were measured prior to training. After six months they were re-assessed to enable comparison between the two groups and to determine the effect the simulation experience had on the students' competence and confidence. An

average performance score from the 15 OSCE stations found that pre-test scores from the first OSCE showed similar competence performance levels between the control (49%) and experimental (48%) groups. As this was not a formal examination in the undergraduate curriculum there was no pass rate set for the OSCE, therefore the level of competence or proficiency in skills was not clearly identified. The post-test scores however did demonstrate a significantly better improvement of 8% for the experimental group ($p<0.001$). This positive impact of simulated training was also reported in Meechan et al's (2011) quantitative study and in the mixed-methods studies by Moule et al (2008), McCaughey and Traynor (2010), Hope et al (2011) and Nevin et al (2014).

A pre-test post-test design was also used by Moule et al (2008) in the first phase of their mixed-methods study. They aimed to measure the acquisition by undergraduate nursing students of a number of skills including basic life support, manual handling, infection control, clinical decision-making and managing violence and aggression. Students demonstrated a significant improvement ($p\leq0.001$) in basic life support skills at the post-test. Skills acquisition was determined using an OSCE and 75% of the participants achieved the pass rate of 75 marks from a total of 100 (Moule et al, 2008). Meechan et al (2011), however, report a pass rate of 95% in the OSCE. No pre-test results were available to determine significance but students' perceptions of their competence and competence level were determined using a Clinical Skills Acquisition Survey. The improvement in the number passing the examinations when compared with Moule et al (2008) may be explained by the fact that the students in Meechan et al's (2011) study were provided with the opportunity to attend four additional practice sessions before completing their end of year OSCE; there is however no empirical evidence to determine the actual transfer and retention of learning or the level of competency achieved.

Other limitations in the studies reviewed include attrition rates (Aliner et al, 2006; Moule et al, 2008) and poor response rates (Meechan et al, 2011). The impact on the overall results is unknown. In the case of Aliner et al's (2006) study, only 99 students completed the second OSCE from an original starting sample of 133. Moule et al (2008) failed to reach the pre-set minimum requirement of 62 using a

power calculation of 80% (α = 0.05) (n=50). From an original sample of 231 undergraduate nursing students in Meechan et al's (2011) study, only 140 returned their completed questionnaires. Nonetheless, the researchers argue that their findings provide quantifiable evidence of a positive impact of simulated training on clinical skills performance among undergraduate nursing students. Despite these limitations they do provide some objective measurement to help establish the effectiveness of using the OSCE to determine skills acquisition, and demonstrate that simulation-based training leads to improvement in OSCE scores. Only Aliner et al (2006) used a control group to determine the significance of the simulated approach when compared with traditional classroom-based teaching methods. While these studies present evidence supporting the use of simulation and the OSCE as a teaching methodology for clinical skills acquisition among undergraduate nursing students, none provide objective evidence of skills retention or transfer to clinical placements.

Based on the literature reviewed in this study it is argued that simulation and the use of OSCE have positive benefits for undergraduate nursing programmes. Benefits identified by students include linking theory to practice (Morgan, 2006; Houghton et al, 2012a), an increase in confidence and competence levels (Moule et al, 2008; Meechan et al, 2011) and the ability to learn in a safe environment (McCaughey and Traynor, 2010; Wellard and Heggen, 2010; Houghton et al, 2012a). The studies present a strong argument for the use of mixed-methods research to link the perceptions of both students and staff regarding the benefits of simulation with quantifiable measures of skills acquisition. The range of methods and samples used in the studies reviewed supports the use of simulation as a suitable teaching methodology for undergraduate nursing programmes as it draws on a variety of adult learning theories to support deep learning approaches. In fact, McCaughey and Traynor (2010) argue that the findings from their study strengthen the case for simulation, and posit that simulated learning encompasses the cognitive, psychomotor and affective domains of learning which link directly to the elements of competence (cognitive, affective and psychomotor) identified for this study.

None of the studies above, however, report any objective measurement supporting the perception that the learning that occurred from the simulated experience was transferred into clinical practice, and whether it therefore resulted in improved patient care. There is a general acceptance that because simulation is performed under artificial conditions the skills learned are not always directly transferable to clinical practice (Wellard and Heggen, 2010; Hope et al, 2011; Houghton et al, 2012a) and most studies recommend further research to ensure the effective implementation and transferability of learning into the clinical care setting (Aliner et al, 2006; Moule et al, 2008; McCaughey and Traynor, 2010; Wellard and Heggen, 2010; Meechan et al, 2011; Houghton et al, 2012a). In fact in a separate paper Houghton et al (2012b) emphasise the need to establish a greater link between education theory and practice to enhance the transferability of the previously learned skills. The literature confirms Edgecombe et al's (2013) deduction that while research and documented experience of simulation in nursing education is increasing, there is limited research pertaining to evidence-based principles or theory on how the learning that occurs when using simulation is transferred to practice. It is therefore critical to examine the evidence on two aspects: first, how to determine the level of learning that occurs when using simulation methods in the clinical skills laboratory (CSL) and secondly, how that learning is transferred to clinical practice.

Some studies did elicit responses regarding the perception of students' ability to transfer the clinical skills learned. For example, the students in Meechan et al's (2011) study were more ambivalent in their assessment of their ability to transfer the skills learned than they were about their perceived levels of competence and confidence. Based on the students' perceptions, Meechan et al (2011) concluded that the introduction of clinical skills teaching and assessment within the university's simulation suites improved the acquisition of clinical skills. The student evaluations in Aliner et al's (2006) research led them to conclude that the OSCE was an important assessment component of their study and they further concluded that simulation is a valuable method of equipping students with a minimum of technical and non-technical skills before they are required to use them in practice settings. The transferability of learned skills to practice, however, remains untested.

Critical analysis of the nursing literature supports the argument for the use of OSCE as a means to determine clinical skills acquisition in the simulated environment but the evidence for it predictive validity of clinical competency is less clear. As a performance-based assessment it has been shown to help identify a level of competence in the cognitive, affective, and psychomotor elements in skills performance (Cant et al, 2013), albeit in a simulated setting. A major challenge for educators therefore is to analyse how students transfer simulated learning to the clinical environment.

2.2 The Transfer of Simulation Learning to the Clinical Placement Setting

The existence of a theory-practice gap within the professional nursing literature has been recognised since the end of the second world war (Hewison and Wildman, 1996), and has been widely documented ever since (Hatelivk, 2012). It generally refers to nurses experiencing a transition shock when they encounter a gap between the knowledge acquired in initial nursing education and the knowledge demands in occupational practice (Scully, 2011). This study argues that currently there does not appear to be any empirically measured structure and process that enhance the transfer of learning from the simulated setting to the practice setting.

The previous section highlighted the positive evaluation in the literature of the use of simulation and OSCE in the acquisition and assessment of clinical skills among undergraduate nursing students. Some studies have provided subjective evidence regarding the ability of students to transfer learned skills into the clinical setting (for example, Handley and Dodge, 2013). The literature lacks quantifiable measurement of the transferability and subsequent retention of knowledge, skills and attitudes learned in the simulated setting (Cant et al, 2013). The question regarding the extent to which simulation improves competency in clinical practice, therefore, remains unanswered. Ackermann (2009), amongst others, has raised concerns regarding the retention of clinical skills and the subsequent ability of practitioners to continually use such skills at the required competence level in clinical practice. Ackerman (2009), Oermann et al (2011) and Settle et al (2011)

relate specifically to the acquisition and retention of cardio-pulmonary resuscitation (CPR) skills. Non-CPR studies include Ballard et al (2012), who examined the effect of additional simulated learning on undergraduate nursing students' Blood Pressure (B/P) recording and monitoring skills, Grierson et al's (2012) study on nursing students' acquisition and retention of Intramuscular Injection Technique and Bloomfield et al's (2010) small scale study on nursing students' hand washing skills.

The studies examining acquisition and retention of CPR knowledge, and skills generally, found that retention among the student groups was poor and that there was a deterioration in knowledge and skills at post-test intervals ranging from three months (Ackerman, 2009) to 12 months (Oermann et al, 2011. Using Ackerman's (2009) study as an exemplar a quasi-experimental design was used to compare the acquisition and retention of the CPR knowledge and skills of 67 undergraduate nursing students from one programme in the USA. The experimental group were provided with an additional high fidelity cardiac arrest simulation experience in addition to the recommended standard training (American Heart Association, 2005) provided to the control group. Pre-test knowledge and skills were assessed prior to commencing training using a Multiple Choice Questionnaire (MCQ) and Cardio-Pulmonary Resuscitation (CPR) skills evaluation sheet for adult CPR (AHA, 2005). The first post-test was carried out immediately after training and compared with pre-test results; post-test two was completed after a three month period (n=49). Knowledge and skills acquisition was determined by the significant improvement in scores for both groups (Ackermann, 2009). This supports Madden's (2006) earlier study of CPR knowledge and skills retention among undergraduate nursing students at one college in Ireland (n=55). She also reported a significant improvement in CPR knowledge and skills when comparing the immediate post-test scores with the pre-test scores recorded on the day of training.

Both Madden (2006, p,224) and Ackermann, (2009, p 217, 219) reported the p value as p=0.000 however the probability value cannot be equal to zero and standard procedure is to report that $p<0.001$ or else report the exact value to the fourth decimal point (Hinton et al, 2014) Closer examination by Ackermann (2009)

found that the experimental group scored significantly better (*p=0.015*) which, she argues, is a direct result of the additional high fidelity simulation experience as an intervention. However, after a three month period the post-test results found that retention of knowledge and skills for both groups was poor and that the decline in the control group was significantly greater than that for the experimental group (*p=0.001*). A significant decline at the 10 week re-test for both CPR knowledge (*p=0.004*) and skills (reported as p=0.000 i.e *p<0.001*) was also reported by Madden (2006). Other studies continue to report a decline in CPR skills among nursing students. For example, Settles et al (2011) provided additional high fidelity CPR training to their experimental group and, although the experimental group scored higher at the post-test intervals, no significant difference was found and both groups' scores (n=148) deteriorated over time. However, the attrition rates were poor with only 18 students returning for the final test; the level of deterioration (if any) among the remaining 130 participants is therefore unknown, making it different to draw any real conclusions.

In a much larger randomised control trial (n=606) across 10 nursing schools in the USA, Oermann et al (2011) tried a different intervention. The experimental group were provided with the opportunity to practice their CPR psychomotor skills for six minutes using a Laerdal Resusci-Anne CPR skills reporter manikin. Every three months, and up to one year, 20% of each group were randomly selected for CPR reassessment to determine how well they retained their skills. The final 20% from both groups were then provided with an update in their CPR training. Although there was a decrease in skills retention among the control group, Oermann et al (2011) found that not only did the experimental group score significantly better than the control group on the post–test assessments ($p \leq 0.005$) but, contrary to the findings of Madden (2006), Ackerman (2009) and Settles et al (2011), the experimental group demonstrated an improvement in their CPR skills over the time period of the study.

Overall, the results from Madden (2006), Ackerman (2009), Settles et al (2011) and Oermann et al (2011) confirm that retention of knowledge and skills related to CPR does deteriorate over time. Nonetheless, there has been some success in reducing the deterioration by using high fidelity simulation. In fact Ackerman, (2009) argues that although overall retention of knowledge and skills was not

maintained, the significantly higher level of CPR knowledge and skills retention demonstrated by the experimental group supports the use of simulation as a method to improve skills acquisition. Furthermore Oermann et al (2011) demonstrated that introducing deliberate practice at regular intervals can prevent deterioration occurring. They suggest that their findings support the argument that in order to perform skills consistently at a competent level and to transfer learned competences into clinical practice, nursing students require opportunities to practice their skills in order to improve their performance.

The results from these studies seem to support Benner's notion of competence development, in that competence is a result of experience (Benner, 1984). It could be argued that assessment of student's clinical skills competency in the laboratory setting may not represent actual learning of the skills because to actual learning would require a measurement that the skill has been retained and performed at a later time. The literature would suggest therefore that the retention and transfer of learning related to CPR knowledge and skills would seem to require focused and repetitive practice, with some means of assessing performance and providing constructive feedback. There is also the argument that CPR skills are specialist in nature and not the sort of skill that the student nurse would be applying on a daily basis during 'everyday' clinical practice. As such, the lack of application of CPR skills could contribute to the deterioration; it is clear therefore that evidence regarding the acquisition and transfer or retention of more basic clinical nursing skills is required.

Only a small number of studies seem to have specifically addressed this question. For example, nursing students' acquisition and retention of hand washing skills was examined by Bloomfield et al (2010), specifically to assess whether nursing students could retain the theory and skill more effectively when taught using Computer Assisted Learning (CAL) as compared to traditional skills training in the Clinical Skills Laboratory (CSL). A two-group randomised control design was used from a population of 420 first year nursing students at one London University. The control group (n=113) were provided with traditional teaching and practice supervision in the CSL, while the intervention group (n=118) worked independently through a self-directed CAL module. Baseline knowledge and

skills were determined by MCQ and by OSCE, using a hand washing skills checklist previously tested for content validity and reliability. Similarly to Ackermann's (2009) CPR study, both groups in Bloomfield et al's (2010) study demonstrated a significantly higher score in hand washing knowledge and skills immediately after the teaching intervention and at the two-week and eight-week follow up tests ($p \leq 0.000$). The median score for the experimental group was significantly better in the hand washing skills test at the eight-week post-test (*p=0.024*). However there was a high attrition rate in the study, with only 42 students in the intervention group and 44 in the control group completing the eight-week follow up; a loss of 145 students from the original sample.

High attrition rates were also reported by Ackerman (2009) and Settles et al (2011). Reasons for drop out vary, but the missing data may have a direct implication on the findings of all three studies. As with Oermann et al's (2011) study, Bloomfield et al (2010) found no decline in either knowledge or skills over an eight-week period and demonstrated a level of hand washing skills acquisition and retention in both groups. However, contrary to the findings of Oermann et al (2011), this cannot be attributed to the intervention as retention was evident in both groups, suggesting that CAL was at least as effective as conventional teaching methods in teaching the theory and practice of hand washing. It could be argued that the nature of hand washing as a clinical skill, although essential for nursing practice (Nicol et al, 2012) is not as technically complex as other essential skills required by the competent nurse and comprises many of the fundamental motor components used in social forms of hand washing. Furthermore the students in Bloomfield et al's (2010) study had completed their first clinical placement where, unlike the complex skills required for CPR, regular hand washing would be required, with the potential to increase the students' proficiency prior to the follow-up assessments. However, the findings do support the principle alluded to earlier that experience leads to competence.

The retention of nursing students' injection technique was examined in Grierson et al's (2012) study. In comparison with Oermann et al (2011), Grierson et al (2012) used video-based observational practice as an intervention and found that, for nursing students' Intramuscular Injection (IM) technique the intervention

was effective in extending simulation-based learning outside of the CSL. Interestingly there were two experimental groups and a control group. None of the groups was allowed to practice the skill either while on placement or on a manikin but were able to view an online instruction video. Additionally, the first experimental group could view their own performance pre-test OSCE performance and rate their performance using the injection technique checklist. The second experimental group was also allowed to view their own and all the other participants' OSCE performance and rate these using the same injection technique checklist. Although this was a small scale study (n=26) it was found that only the second experimental group performed significantly better than the control group ($p=0.033$) in the two-week post-test assessment of injection technique. The observational practice of the second experimental group as described by Grierson et al (2012) is indicative of the scaffolded learning process in the development of competence discussed earlier. The experimental groups in Grierson et al's (2012) study engaged in a self-assessment process that required the students to reflect on their own as well as others' performance. The effect of the reflective process on the improved performance in the post-test was not examined directly, but could be implied by the nature of the intervention.

The study by Ackerman (2009) also failed to examine the effect of the guided reflection element of the study on the students' post-test performance but did acknowledge that this should be incorporated in future studies. From an Irish perspective, Byrne and Smyth (2008) identified the sub-theme of reflective practice from the analysis of their focus groups. Reflection was incorporated into their OSCE process to encourage students to reflect and redeem their performance and, although identified by the educators as an important factor in the students' learning, the study does not provide any evidence from the students' perspective in order to determine if, and how, reflection on skills performance might impact on learning and future performance.

The evidence from the studies by Oermann et al (2011), Settles et al (2011), Ackerman (2009) and Madden (2006) supports the argument that, certainly with CPR skills, there is substantial skill decay with non-practice or non-use. Evidence for other non-CPR skills is limited but studies have also shown that the level of

skill acquisition and deterioration can be improved using interventions that include deliberate practice (Grierson et al, 2012; Oermann et al, 2011), Computer Assisted Learning (CAL) (Oermann et al, 2014), and observational learning incorporating some form of self-assessment and reflection (Grierson et al, 2012; Bloomfield et al, 2010). The goal of training healthcare professionals is more than facilitating competent performance during practice; it is also to enhance the learning and transferability of clinical skills to the practice setting (Wulf et al, 2010). It is therefore necessary not only to determine the level of performance required for competence in a skill but to ensure that appropriate teaching and assessment methods are designed and implemented to improve skills acquisition, retention and transfer. While it has been suggested that the process of reflection is a key factor in enhancing learning for clinical skills competence (Grierson et al, 2012; Ackerman, 2009; Byrne and Smith, 2008), there is a lack of evidence to directly support its effect on the ability of nursing students to retain and transfer competent clinical skills performance into the practice setting. The next section will therefore discuss reflection as a process of learning and further examine evidence of its impact on clinical practice.

2.3 Reflective Practice and Competence Development

Reflective practice has extended across many professional disciplines in an effort to demonstrate evidence of professional development (Nelson, 2012). It is a key component in nursing curricula (Duffy, 2007), a critical component of professional practice (Asselin et al, 2013) and has been identified as a means to bridging the Theory Practice Gap (Hatlevikl, 2012, Scanlon and Udod, 2002). Dewey (1933) is arguably accredited as initiating the modern debate pertaining to reflection (Duffy, 2007). Dewey's (1933) seminal work was focused on helping people develop thinking skills. Reflection was conceptualised as active, persistent and careful consideration triggered by a specific situation. He believed that as a meaning-making process, reflection helps the learner to move from one experience to another resulting in a deeper understanding of the relationship between the experiences. The idea that knowledge emerges from actions and experiences from practice was further developed by Schon (1987) in exploring

the concept of reflection as a means for acquiring professional knowledge. Schön (1987) proposed two types of reflection. Reflection-in-action defined as:

> *where we reflect in the midst of action without interrupting it. Our thinking serves to reshape what we are doing while we are doing it* (Schön, 1987, p. 26).

And reflection-on-action as:

> *thinking back on what we have done in order to discover how our knowing in action may have contributed to an unexpected outcome. We may do so after the fact, in tranquillity or we may pause in the midst of action (stop and think).* (Schön, 1987, p. 26).

Reflection-in-action refers to thinking while doing, whereas reflection-on-action tends to focus on retrospective critical thinking to construct and reconstruct events in order to develop as a practitioner. This concurs with Benner's (1984) "know how" in nursing and the Irish Nursing Board's understanding of reflection as a key element of the competent nurse (An Bord Altranais, 2005). The professional practitioner consciously reviews, describes, analyses and evaluates their past practice in order to gain insight for improving future practice. With reflection-in-action, the professional practitioner examines their experiences and responses as they occur. Schön's focus was on the development of reflective practitioners and how professionals could learn from experience and become more aware of their implicit knowledge or the "knowing that" which Benner (1984) refers to in her definition of competence. For Schön (1983), reflection-in-action was the core of 'professional artistry'. While he later acknowledged that reflection-on-action is useful for the development of reflective practitioners (Schön, 1987) his work tends to focus on the concept of reflection-in-action. He argued that because of the complex and unpredictable nature of professional practice the professional practitioner would need to be able to do more than follow the steps of a procedure Schön (1987). They should be able to act intuitively and creatively as they draw on experience linking theory to practice. In contrast, the novice practitioner (Benner, 1984) lacks knowing-in-action (tacit knowledge) and tends to rely on rules and procedures, applying these in a mechanical fashion. The difference therefore is the focus on thinking and knowing in the midst of action, which constitutes competency.

Schön's (1987) work has been inspirational and influential in the nursing profession and its key strength lies in the fact that he highlights the importance of reflection-in-action. However his work has been criticised for treating the act of reflecting-before-action as less important (Greenwood, 1993). Boud and Walker (1998) contend that Schön's analysis of the reflective process ignores critical features of the context of reflection. Eraut (2004) makes a critical point when he suggests that Schön's theory lacks precision and clarity; however he previously acknowledged that the concept of reflection-on-action was less problematic. Furthermore, Ekebergh (2007) argues that it is not possible to distance oneself from the lived situation to reflect in the moment, and supports van Manen's (1990) idea that to achieve real self-reflection one needs to step out of the situation and reflect retrospectively. Whilst it could be argued that the complexities of Schön's theory make it difficult to apply to the practice of nursing education, this study argues that Schön's theory of reflection has utility because it rests on the premise that it encourages student nurses to engage in the process of reflecting both in and on action. Both reflection-in and reflection-on action allow the student nurse to revise, modify and refine their expertise; regardless of whether the level of expert has been achieved or if they are still at the novice level all practitioners should reflect on practice, both in general terms and with regard to specific situations.

Kolb's (1984) work on adult learning posited that learning is not something that happens just because of experience: at the outset information has to be processed, reflected on, related to previous learning and then re-applied to practice. His experiential learning cycle outlined a process of moving from the first stage of '*concrete experience'*, where the student can provide a description of the event, to the second stage of *'reflective observation',* which includes analysing emotions and linking prior experiential knowledge. The third stage, '*abstract conceptualisation',* includes linkage to relevant literature and discussion with colleagues with resultant modifications or a reappraisal of thinking on how the situation will be managed. The final stage of '*active experimentation'* leads to the formulation of a hypothesis by which the individual tries out new theories, approaches or solutions in similar or new situations. Patterson and Chapman

(2013) suggest that this subsequently becomes the concrete experience on which succeeding reflections can be made.

The focus of Kolb's (1984) cycle of experiential learning is mainly on past events. Its purpose, from an educational perspective, was to learn from past experience in order to be better prepared for future problems and decisions. Similarly Eraut's (2004) work, although not specific to nursing, suggests that patterns of past reflection can vary depending on the profession, the situation and the circumstance. This aspect of reflecting on past actions is highly pertinent to the practice of nursing and underpins constructivist approaches to learning, as discussed previously. It is therefore argued that it is necessary to consider how best to incorporate reflection into undergraduate nursing curricula, considering not only the theoretical component but, importantly, how it can be used more constructively in the practice of nursing.

Schön (1987) viewed practice as being central to professional curricula and advocated the use of practicum–based coaching. The practicum is a setting designed for the task of learning the actual practice of nursing; it equates with the skills lab where the use of simulation scenarios requires students to work in groups and as individuals in order to be supported and challenged to develop the critical element of reflection as applied to the practice of nursing. Brooks et al (2010) support this premise and further suggest that reflection provides an opportunity for the students not only to apply facts, rules and procedures, but also to learn how to think. Referring back to Benner's (1984) seminal work, the novice practitioner is viewed as having propositional knowledge that has been acquired from books or courses, but lacks experience on which to base their practice decisions. As the novice's clinical experience increases, so too does their practical knowledge.

Reflection, however, can be a difficult concept to grasp and Bulman and Schutz (2008) argued that a universal definition is not possible due to individual interpretations of the concept. A reflective framework that has significant application and utility for nurses and is used in the undergraduate programme

associated with the current study is Gibbs' (1988) reflective cycle. It is known for its simplicity and utility as it can be a guiding learning process for beginning reflectors or for practitioners (Jasper, 2006). Gibbs' (1988) reflective cycle builds on Kolb's (1984) cycle and consists of six stages of reflection and action following an experience.

In the first, descriptive stage the practitioner describes what happened and then moves to the second phase, where the thoughts and feelings that occurred at the time are explored. In the evaluation an analysis is carried out in the form of recognising what was positive and challenging about the experience, leading to the next stage where further analysis involves trying to make sense of the situation and recognising the impact that it had on the nurse's professional practice. Gibbs (1988) describes analysis of an event as a process of '*identifying, challenging, exploring and evaluating knowledge*' (p. 46) relevant to it until it begins to make sense. Once the analysis is complete the practitioner moves into the conclusion stage, where the literature may be explored and possibly colleagues consulted to understand the situation better and determine what else could have been done (Patterson and Chapman, 2013). The final stage involves understanding what has been learned from these incidents. Taking action is the key; Gibbs' (1988) reflective cycle prompts the practitioner to formulate an action plan in relation to the level of competence. This enables the reflective practitioner to look at their practice and see what they would change in the future, how they would develop their practice or improve it, and therefore transfer this knowledge into action to inform future competent practice (Jasper, 2006).

Jones and Alinier (2009) argued that the purpose of reflective practice is to actively seek opportunities for future actions and applications of what has been learned, otherwise it remains a theoretical and passive concept. Bulman and Schutz (2008) suggest that nursing, as a practice discipline, needs to provide education programmes that prepare nurses to care competently for their patients and to continue to develop critical reflective skills and knowledge over their professional lifetime. Traditionally, the higher education system has promoted the division between theoretical and practical knowledge and, as stated earlier, this is a challenge for the nursing profession in teaching undergraduate nurses.

Nursing education, however, requires a combination of theoretical and practical components and this in turn necessitates the integration of theory and practice. Becoming a nurse therefore involves the cognitive, affective and psychomotor domains of learning, which constitute competency in the nursing discipline. Eraut (2004) believes that the transfer of theoretical knowledge acquired in an education programme to a workplace setting may be difficult because of differences in context, culture and modes of learning. It is therefore argued that realising a connection or coherence between nursing students and practical nursing tasks can be considered a vital step in bridging this theory-practice gap. The development of nursing students' reflective skills is widely viewed as a key component in helping them perceive coherence between theory and practice (Hatlevikl, 2012). The development of reflective skills would be an essential element in achieving the competent transfer of knowledge and skills and attitude (the components of competence) to the practice setting.

A reflective framework was implemented by Jones and Alinier (2009) which was designed to facilitate reflective learning around simulation exercises rather than reflection in practice, their Reflective Simulation Framework (RSF) was evaluated among undergraduate nursing and paramedic students at one university in the UK (n=42). They worked on the premise that reflective practice is an important component of simulation learning and that it enhances students' learning and clinical competencies through the closer integration of theory and practice. Jones and Alinier (2009) further argued that reflection does not happen of its own accord and therefore students need a model or framework to initiate and guide them effectively through the reflective learning process. Following the implementation and use of the RSF an 11-item evaluative questionnaire incorporating a combination of open and closed questions was administered to the students participating in the study. The results showed that the majority of students found the use of the framework helpful to their learning. They further found that 80% of students indicated that they would use such a framework in clinical practice and identified the 'step by step guide' as a significant benefit. Jones and Alinier (2009) however do suggest that an in-depth study of the use of such a framework should be carried out in order to generate both qualitative and quantitative data that

might illuminate student responses in more detail and had a direct influence on the design of the current study.

The literature does acknowledge that knowledge emerging from reflective analysis is a process that can be compartmentalised in a series of steps that practitioners can follow (Mantzoukas, 2008). In a study exploring how experienced acute care staff perceive and use reflection in clinical practice Asselin et al (2013) identified four key phases in the reflective process. They analysed in depth interviews of twelve experienced staff and found that staff engaged in primarily in the process of reflection on action. This involved framing of the situation, pausing, engaging in reflection and emerging intentions (development of intentions to change practice. These can be directly linked to the steps of Gibbs' (1988) model described earlier and support its utility for the current study. The influence of guided reflection on second-year nursing students' experience of theory-practice integration at one hospital in South Africa was examined by De Swardt et al (2012). Students (n=7) were guided through the reflective process using a semi-structured interview technique and then asked to provide written narratives of their experience. Although the sample was small and the findings are limited to context, the study concluded that the use of guided reflection assisted the nursing students in clarifying theoretical and practical experiences and in reaching a changed perspective by understanding the theory-practice link. This supports both Ackerman's (2009) belief that guided reflection would have a positive impact on students' learning and the findings from Grierson et al (2012) and Bloomfield et al (2010), evaluating the reflective process positively.

Problems facing professional educators when encouraging reflection as a learning process are discussed by Eraut (2004), who suggests that in order for the reflections of novice nurses to be situated more in the current action there is a need for clinical educators to be able to 'trigger' reflective periods on the job. He further suggests that reflection needs to be flexible and have sufficient attention to purpose in order that participants are able to recognise the value of the time devoted to it. De Swardt et al (2012) also identified time constraints in the clinical setting as a barrier to reflection and support both the findings from

Hovland's (2011) qualitative study of students' experiences of supervision in the clinical placement and the findings of Hong and Chew (2008). Reflection in practice is not without problems and guided reflection, although beneficial, has resource implications on staff and on time (Grierson et al, 2012). Any method that would enable students to engage in the reflective process while on clinical placement, but without the resource implications of current methods, could therefore be a key tool in narrowing the theory-practice gap.

Allied with reflection is the process of self-assessment, requiring students to test their own knowledge and skills as part of their learning (Boud et al, 2006). In fact Yoo et al (2010) argue that students' reflection on their own performance is an effective method of learning and assessing clinical skills. The findings from recent studies appear to be contradictory (Lundquist et al, 2013; Hawkins et al, 2012; Baxter and Norman, 2011; Watts et al, 2009). For example Lundquist et al's (2013) study of 400 second-year pharmacy students in one college in America found that the students under-assessed their performance in communication skills compared with the grading awarded by faculty using the same scoring rubric. In contrast, Hawkins et al (2012), found that the self-assessments of the 31 medical students in their study compared favourably with those of their assessors. The students were video recorded performing a suturing task, then provided with an expert performance as a benchmark and asked to view their recording and assess their own performance. The students' self-assessment scores had a strong correlation with the expert scores provided by faculty ($r=0.83$, $p<0.0001$). The ability of fourth-year undergraduate nursing students ($n=27$) to assess their own performance in responding to emergency situations was examined in Baxter and Norman's (2011) study, conducted at one Canadian college. Using Pearson's correlation the results from the OSCE were compared to the students' self-assessment and there was no evidence of a positive association between self-assessment and observed performance (Baxter and Norman, 2012). Watts et al (2009) used video recordings to determine the accuracy of 86 first-year nursing students' ability to assess their performance in wound dressing technique and found that, in direct contrast to the findings of Lundquist et al (2013), the students had a tendency to overrate their performance when compared with faculty.

In their consideration of the evidence base on self-assessment from 1990-2005, Colthart et al (2008) were unable to find a solid evidence base for effective self-assessment. They did find some studies that reported evidence of self-assessment being enhanced by feedback, particularly through the use of video evidence. Yoo et al (2010) also used self-assessment of video recorded performance among undergraduate nursing students. The experimental group (n=20) was provided with the opportunity to review and assess their performance in urinary catheterisation from the video recording of their OSCE, using the same marking sheet. The students were again assessed on the same skill after eight weeks and post-test results from the experimental group (n=20) demonstrated statistically significant ($p<0.001$) better competency scores than the control group (n=20). The conclusion was that being able to reflect and self-assess a video recording of an OSCE performance appeared to increase the retention of clinical skills in nursing students. These findings lend support to the role of reflection in the process of learning from experience.

Practitioners can reflect both ‘in’ and ‘on’ their practice and the critical thinking required in the reflective process to construct and reconstruct events puts it under the auspices of constructivist learning theory (Bastable, 2008). It has been argued that the theories that underpin workplace learning (Croxon and Maginnis, 2009) are based on the theories of adult learning, incorporating reflection in action, critical reflection and experiential learning, and constructivist approaches. It is further argued (Yoo et al, 2008; Levitt-Jones, 2007) that reflecting on and being critical of their own performances may help students internalise information related to the procedure. In order to build on prior knowledge and develop and embed new knowledge students must engage in reflective practice and faculty should consider how best to integrate reflection within curriculum design.

Conclusion

This literature review has argued that clinical skills acquisition remains an essential element of a student nurse’s learning and the development of competence in performing clinical skills is crucial to the care and safety of

patients. Although simulation is an increasingly popular approach to the teaching and assessing of clinical skills within healthcare education and certainly has its place in nursing, evidence exists regarding the poor retention and deterioration of knowledge and skills over time specifically with CPR, and there is concern regarding nursing students ability to transfer knowledge and skills learned in the classroom to the practice setting. Analysis and synthesis of learning are explicit outcomes to be achieved for eventual transfer of learning to work related situations. It is further argued that constructivism, which combines students constructing and building on their knowledge base through the process of learning modalities, offers those in nursing education a philosophical shift from traditional approaches to education. Constructivism embraces adult learning theories that include experiential learning and learning through reflection.

It is evident from the literature review that the retention and transfer of knowledge within nursing education is inadequately researched. The review indicates that the reflective process has not been formally linked to a structured performance checklist of clinical skills. It is argued that, based upon the literature review, there is no clinical skills tool available for undergraduate nursing students that synthesises the process of reflection with competency-based self-assessment criteria to transfer and re-activate prior learning from the simulated environment to the practice setting.

The current study is an attempt to address this lacuna in an integral area of competency transfer to the clinical learning environment, to improve the quality of the learning experience, and ultimately the patient's experience of competent care. This study posits that central to the research is the definition of clinical skills competence incorporating the three key elements of knowledge, skills and attitude. The successful transfer of learning to the clinical practice setting requires learning through simulation in the safety of the Clinical Skills Laboratory. This effectiveness of this learning is determined by the use of an OSCE and maintained by the use of self-assessment and reflection during clinical placement, facilitated through the use of reflective learning tool. The next chapter sets out the methodology employed in this study, guided by a conceptual framework developed from the literature review.

Chapter 3: Research Methodology and Methods

Introduction

This chapter begins by defining the research question and the study aims and objectives. The argument for the conceptual framework that underpins the study is then presented, followed by a discussion on the philosophical and epistemological bases of the mixed methodology approach taken. The methods section provides the rationale for the design of the educational approach used in the study incorporating simulated learning, OSCE and a practice based learning aid and provides details of how this was implemented. Details are also provided on how participants were recruited for the study and the sampling methods used for each phase. The design and piloting of the research instruments are described, along with an overview of the sequencing of both qualitative and quantitative data collection. An overview of the ethical considerations of the study precedes the final sections, which provide the necessary detail of the mixed-methods analysis framework used and the measures taken to ensure quantitative rigour and qualitative integrity.

3.1 The research question, study aim and research objectives

Research question

The research question for this study originated from the researchers interest in how student nurses develop competency in clinical skills and the problem of transferring learning from the classroom to clinical practice. After a detailed exploration and analysis of the literature the research question was therefore identified and refined as;

“Does a practice based learning aid influence theory practice integration for clinical skills competence among undergraduate nursing students’?” The research question provides direction and focus for the study (Sarantakos, 2005). It subsequently determined the methodology and methods and guided all stages

of inquiry, analysis and reporting. Based on the research question the following study aim and objectives were identified.

Study aim

The aim of this study was to explore how a practice based learning aid influenced theory practice integration for clinical skills competence among undergraduate nursing students.

Research Objectives.

1. To develop a practice based learning aid that would influence first year undergraduate nursing students' integration of theory to the practice setting of nursing

2. To measure the level of clinical skills competence among first year undergraduate student nurses following simulation-based training prior to clinical placement.

3. To explore the influence of the practice based learning aid on student participants' competency in clinical skills and learning.

4. To explore and describe first year undergraduate student nurses' perceptions of the influence the practice based learning aid on clinical skills competency transition from novice towards competent practitioner.

3.2 Conceptual framework

The literature review demonstrated a dearth of empirical research that addresses how students are enabled to develop and transfer specific nursing skills, learned in a simulated environment, to the practice setting (Section 2.2). The arguments presented in the literature review informed this study's underpinning conceptual framework and led to the development of the educational approach implemented in this research. The key variables that underpin the framework are clinical skills teaching and learning, and the transition of clinical skills competency to the practice setting of nursing. Figure 1 presents a conceptual framework created through the synthesis of several seminal works that include: adult learning theory (Knowles, 1984), experiential learning (Kolb, 1984), reflection (Schön, 1987; Gibbs, 1988), and competency theory, all under the frame of social

constructivism. The rationale for adopting this approach relates directly to the philosophical and epistemological basis of constructivism.

This lens of the researcher supports the position that as learners, undergraduate nursing students construct new ideas or concepts based upon their current or past formal and experiential knowledge (Jarvis et al, 2005). Rather than accepting the traditional positivist view that physical and social reality exist independently of our knowledge and consciousness, this study supports the constructivist view that there is no absolute knowledge, just our interpretation of it (Patton, 2002).

Within constructivism, learning is perceived as an active rather than a passive process, where knowledge is constructed rather than acquired (Patton, 2002). Acquiring knowledge therefore requires the nursing student to consider information provided from whatever source and, based on their past experiences, personal views and their cultural background, construct their own interpretation of the information provided (Brandon and All, 2010). The belief is that the student then ‘constructs’ their own meaning by building on previous knowledge and experience (Brandon and All, 2010). These new ideas and experiences are then considered along with existing knowledge and the student constructs new or adapted rules to make sense of the world (Brandon and All, 2010).

The assumptions of the conceptual framework presented in Figure 1 are rooted in reflective practice and competency. It is argued that reflection and the integration of experiences with existing knowledge are basic concepts within constructivism (Billings and Halstead, 2005).

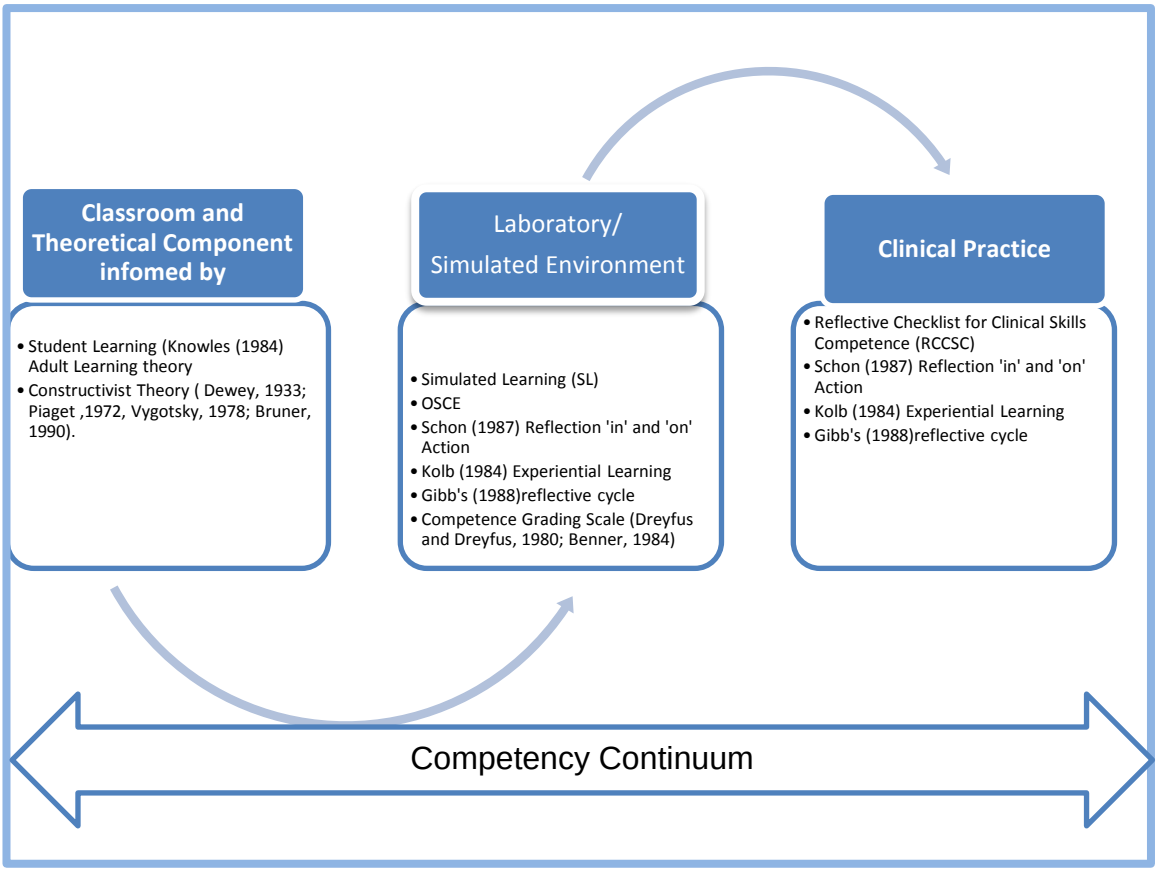

Figure 1: Conceptual Framework

Dewey (1933) often cited as the philosophical founder of constructivism, was a firm believer in the benefits of students engaging in real world settings and practical workshops in which they could demonstrate their knowledge. The education approach implemented in this study therefore adopts the position that learning clinical skills competency includes three elements: theoretical learning in the classroom, learning through simulation within the Clinical Skills Laboratory (CSL) and learning through experience in the practice setting; together these form key components of the competency learning process. The conceptual framework identifies three core settings where specific learning relating to competency in clinical skills takes place, including the classroom (Hunter and Krantz, 2010), the simulated environment (Rutherford-Hemming 2012) and the practice setting (Cope et al, 2000). The suggestion is that they will form part of a continuum of competency and lifelong learning. The conceptual theory is that the transfer of this knowledge and skills, their integration and application in practice will represent the bridging of the theory-practice gap. The process of reflection is a key factor in this conceptual framework and will be developed in this research.

The conceptual framework (Figure 1) posits that theoretical knowledge gained in the classroom is afforded meaning when synthesised with the learning experience gained in the simulated environment, identified as a core belief of constructivist learning theory (Jarvis, 2006). Constructivists assume that meaningful learning occurs through reflection, by linking new knowledge to an existing framework of knowledge, and by the development of new understanding through reflection (Dumchin, 2010). Within the simulated environment the nursing student is encouraged to engage in experiential learning activities, which build upon previous knowledge and experience so as to construct new knowledge and enhance competency (Handley and Dodge, 2013). These learning activities include active observation of competent performance, the opportunity to apply knowledge to practice, and also to engage in peer assessment, self-assessment, reflection and dialogue (McCaughey and Traynor, 2010).

Based on the conceptual framework, this study implements an educational approach that incorporates a practice based learning aid that synthesises the process of reflection along with experiential learning and a criterion-based checklist. The belief is that these are the key learning variables which will enable students to apply theory to practice. The practice based learning aid was named the Reflective Checklist for Clinical Skills Competence (RCCSC) and captures the key variables synthesised in Figure 1. The literature has shown that student nurses learn through experience in the practice setting (Levitt-Jones, 2006), can engage in the process of both reflection-on-action and reflection-in-action (Schön, 1987), acquire competence in clinical skills (Croxon and Maginnis, 2009) and also develop their knowledge and deeper understanding of the social world of nursing practice (Grealish and Ranse, 2009; Mannix et al, 2005). The study explores how the educational approach influenced competency transition and development and the learning experiences of the students.

3.3 Philosophical rationale for the selected methodological approach

The philosophical base for the current study is underpinned by the methodological dichotomy of positivist and interpretive methodology and methods (Mesel, 2013). Adopting a purely positivist or interpretative approach would fail to answer the research question and the mixed range of research objectives developed for this study. The first two research objectives required the development and implementation of a competency grading scale to establish the level of clinical skills competency obtained at the OSCE and during clinical placement. These objectives support a quantitative approach providing numerical and measurable information for the study. Analysis of the quantitative data provides an indication of the level of competency achieved and an indication of the progression of the students' competency in clinical skills as they move from novice towards becoming a competent practitioner. It further provides an indicator of the level of competency transfer from theory to practice. The evaluative questionnaire (Appendix 7) explores students' perceptions of using the practice based learning aid and provides additional quantifiable data of the how it influenced their clinical skills competency.

Objectives three and four seek to gain a deeper understanding of the complex learning and reflective experiences of the students during their participation in the educational approach incorporating a practice based learning aid, implemented for the study. A qualitative approach was required to provide in depth analysis and understanding of the written reflective comments from the practice based learning aid and from the focus group discussion. Together, these data sources help to provide a deeper understanding of the students' perceptions of their learning experience and enhance our knowledge and understanding of the learning processes during the transition from theory to practice and the clinical skills competency transition from novice towards competent practitioner. A mixed-methods design incorporating both qualitative and quantitative measures was therefore selected in order to achieve the level of understanding necessary to meet the research objectives identified for the study (Tashakkori and Teddlie, 2010).

Pragmatism, as a philosophical approach, can provide a solution to the methodological dichotomy posed by the competing philosophical paradigms of

positivism and interpretivism. It offers an epistemological justification and logic for mixing approaches and methods (Johnson et al, 2007). Pragmatism provides a practical and outcome-oriented solution to addressing the research objectives for this study. The overlap of both positivist and interpretive paradigms requires a combined approach that can potentially capitalize on the respective strengths of both quantitative and qualitative designs (Ostlund et al, 2011).

As a methodology, mixed-methods research is now recognised, along with qualitative and quantitative research, as the third major research approach or paradigm (De Forge and Shaw, 2012). It is regarded as an approach to knowledge that attempts to consider multiple viewpoints, perspectives, positions, and standpoints (Johnson et al, 2007). Within the fields of social, educational and healthcare research there is an increasing awareness and recognition of the value of a mixed-methods approach to research (Creswell and Plano Clark, 2011). For example Houghton et al's (2012a) study, reviewed in Chapter 2, found that using a mixed-methods approach ensured that a rich confirmation of findings were evidenced and that more comprehensive data was generated. The use of mixed-methods designs in nursing and the integration of methods from different philosophical paradigms is however, disapproved of by methodological purists (Creswell and Plano Clark, 2009). Lipscomb (2008), for example, argues that adopting a mixed philosophical approach is untenable because the key feature that distinguishes the differences between philosophical paradigms is their inductive and objective nature.

A key question of this research is exploring the influence of the practice based learning aid on students' clinical skills competency levels, which involves an element of deductive reasoning from data gathered using a post-test questionnaire (Appendix 7). However, inductive reasoning will also be required to further investigate the students' experiences and, as such, makes it almost impossible for the researcher to operate in an exclusively positivistic or interpretivist paradigm. This study therefore supports Morgan's (2007) thinking and argues for the value of adopting a philosophical pragmatic approach, which relies on a version of abductive reasoning that moves back and forth between induction and deduction.

In the field of social science the researcher frequently has to work between the frames of reference of objectivity and subjectivity (Morgan, 2007). It is argued that both qualitative and quantitative strands of data needed to be collected, analysed and synthesised in order to answer the research question and meet the research objectives of this study. Comparing and contrasting the data produced a more complete understanding of the various learning and reflective processes involved in the educational approach, specifically the practice based learning aid, since the learning aid integrates both quantitative and qualitative data. The quantitative data was generated from the competency grading scale and the clinical skills checklist; it provided some measurement of the level of competency attained at various stages during clinical placement. The qualitative data was generated from the written reflective comments recorded during placement after each skill is completed and helped to provide insight into the students' learning experience. Adopting a pragmatic approach allowed for the results and knowledge gained from this study to be considered contextually and draw conclusions on the implications of the findings for theory and practice. The next section will discuss the mixed-methods design used in this study underpinned by the philosophy of pragmatism.

3.4 Design of the Study

An explanatory-sequential design as described by Creswell and Plano Clark (2011) was selected as the most appropriate method to answer the research question and meet the study's aims and objectives. The design allowed the researcher to employ a range of both qualitative and quantitative methods in the pursuit of acquiring knowledge related to clinical skills competency among undergraduate nursing students (Gerrish and Lacey, 2010). The study required the recording of competency levels at three stages along with written reflective comments and evaluative data to explore the conceptual thinking that the educational approach of integrating theoretical and simulated learning with an OSCE and a practice based learning aid would influence the development and transfer of necessary knowledge, skills and attitudes (i.e. competency) in six

identified clinical skills. The rationale rests on the premise that the mixed-methods design provides for a greater understanding of the learning processes involved in the development, retention and transfer of clinical skills competency and the influence of the practice based learning aid on this learning. In addition, the research question mandated that methodological pluralism and creativity, which utilises the strengths of both qualitative and quantitative approaches, was required to operationalise the research design. The resultant mixed methodological design provided a map that guided the research study and provided order and clarity in relation to the research process.

The practice based learning aid was designed to collect both quantitative and qualitative data. The skills checklist and competency grading scale components provided statistical data to help identify the influence of the practice based learning aid on students' clinical skills competency development and transfer. This was then followed by collecting written reflective data to provide insight into the learning and reflective processes used by students when reflecting on their clinical skills performance. Triangulation is achieved through the collection of data from the learning aid, which incorporates both a clinical skills checklist and competency grading scale (the quantitative strand) and data from the reflective comments (the qualitative strand). A strand, as a component of a mixed-methods study, encompasses the basic process of conducting quantitative or qualitative research: posing a question, collecting data, analysing data, and interpreting results based on that data (Teddlie and Tashakkori, 2009). Each strand remained independent during the analysis stage, and the design enabled the recorded competency levels and written reflective comments from the practice based learning aid to be collated sequentially. The findings from both data sets could then be compared and contrasted to help explore the level of competency achieved while at the same time providing some insight into the learning and reflective experiences of the student during this learning transition.

The quantitative strand of the mixed methods design provided a means to explore clinical skills competency levels using a criterion checklist and a competency grading scale helping to answer the research question and meet the research objectives for the study. Initial consideration was given to the use of a

Randomised Control Trial (RCT) as a method of determining the cause and effect of the educational approach incorporating the practice based learning aid, as it would allow for rigorous comparison of results from a control and experimental group (Gerrish and Lacey, 2010; Moule and Goodman, 2009; Burns and Grove, 2007). However, a key aim in this study was the development of a practice based learning aid based on the conceptual framework and the exploration of its influence on augmenting clinical skills competency transfer, rather than measuring cause and effect. An available sample was therefore needed for the quantitative strand and a purposive sample was required to meet the qualitative goals of the study. Details of the sampling and selection methods used are provided in section 3.5. The limited control of extraneous variables within the current study meant that a RCT as a method was rejected. A non-experimental single group pre-test post-test approach was therefore used in the quantitative strand of this mixed-methods study to provide a means to compare clinical skills competency levels at different stages of the research. This form of quasi-experimental design is a popular method in real world when randomisation is not possible (Robson, 2011).

In the quantitative strand of this mixed methods study the independent variable is represented by the educational approach and the dependent variable is the clinical skills competency level. The approach outlined included a measurement of the clinical skills competency level prior to commencing clinical placement. This competency level was then compared with competency levels recorded during clinical practice using the practice based learning aid and allowed for any changes to be observed (Polit and Beck, 2014). Any statistical relationship between the clinical skills competency levels was therefore explored by the researcher and, although assumptions might be made regarding any differences found between competency levels, conclusions regarding cause and effect cannot be made due to the limitations previously identified (Gerrish and Lacey, 2010).

The educational approach used in this study incorporated theoretical learning in the classroom and simulated learning in the Clinical Skills Laboratory (CSL), followed by the use and implementation of a practice based learning aid during clinical placement. The OSCE provided an indication of the effect of the

theoretical and simulated learning on the students' clinical skills competency levels. The competency level recorded for each skill acted as a baseline measurement. The data from the OSCE was collected in the clinical skills lab (CSL) and provides a different setting to that of the pre and post-test data collected during clinical practice. The rationale for this approach related to the need to measure the competency levels in the real world of clinical practice and compare with competency levels from the simulated setting. Furthermore it was impractical to return all of the student participants to the clinical skills laboratory for post-test measurement. To minimise the effect on the data, the same clinical skills checklist and competency grading scale used in the OSCE were incorporated into the practice based learning aid to allow for direct comparison of competency levels at different stages of the research. However, both the pre-test and post-test data from the RCCSC and from the researcher observations were conducted in the practice setting. Comparing the first competency level from clinical practice with the competency level from the OSCE was used to determine the level of retention, deterioration or enhancement of clinical skills competency among the student participants during the summer period away from practice. The competency grades recorded in the RCCSC were also used to determine the level of skills retention, transfer and the continuation of competency after skills training. Together with the evaluative questionnaire (Appendix 7) the quantitative data assisted in identifying if the educational approach incorporating the practice based learning aid influenced students' learning and clinical skills competency levels. Further details outlining the procedure used in the study are provided in section 3.8.

The explanatory-sequential design also generated data for the line of enquiry evaluating the influence of the practice based learning aid on the development, retention and transfer of clinical skills competency from the simulated classroom to the practice setting. The exploratory follow-up within the explanatory-sequential design was needed for development and expansion purposes, where the quantitative data leads to the development of the data collection in the qualitative phase (Teddlie and Tashakkori, 2006) and provides a deeper understanding and explanation of the results generated by the quantitative strand (Creswell and Plano Clark, 2011).

The analysis of the data from the quantitative strand (the OSCE, the practice based learning aid, the researcher's and the students' observations, and the evaluative questionnaire) directly informed the development, design and collection of the data from the qualitative strand (focus group). The focus group was selected as an effective data collection method in order to clarify, explore and confirm ideas with participants on a predefined set of issues. Such groups are typically composed of 6-10 participants, in order to gain a rich data set (Krueger and Casey, 2009). Following the guidelines for the explanatory sequential design, only students who participated in the quantitative strand were selected for the focus group in the qualitative strand (Creswell and Plano Clark, 2011). Section 3.5 provides further details on the sampling methods used in the study.

The key elements of an explanatory-sequential design include sequential timing, mixing and interaction (Creswell and Plano Clark, 2011). Therefore in this study the qualitative data from the focus group was collected after the quantitative data from the OSCE, clinical placement and the evaluative questionnaire were collected and analysed. Furthermore, in order to adhere to the development purpose of mixed-methods research (Green et al, 1989), the interview schedule for the focus group was directly informed by the quantitative findings. It was anticipated that the qualitative data from the focus group would provide further insight into the attitudes, perceptions and opinions of the students who had experienced the educational approach implemented in the study and would contribute to answering the research question. Details of the quality assurance measures taken in the collection and analysis of the focus group data are provided in sections 3.6.4, 3.8.3 and 3.12.1. The focus group allowed for further exploration of the responses from the evaluative questionnaire. This provided greater insight to the students' experiences of the educational approach including their experience of using the learning aid in the practice setting.

The integration and interpretation of the overall results provided answers to the research question to meet the aims of the research study and further determined the contribution that the study makes to professional knowledge, education and research, cumulating in a tentative model of competency learning and transition

being proposed. Details of the mixed-methods data analysis process and guiding framework used are provided in section 3.10.

Figure 2 below provides a diagrammatic model of the research design used in the study linking the various stages to the research objectives (in bold letters) leading to the interpretation of the findings to answer the research question, “Does a practice based learning aid influence theory practice integration for clinical skills competence among undergraduate nursing students’?”

Figure 2: Visual Map of the Mixed Methods Research Design linking phase, research objectives and steps of the design

Research Objectives	Procedure Step	Data Collection	Design
	1.		**Implement 1st Stages of Educational Approach used in the study: classroom theory and simulated learning**
1. To develop a practice based learning aid that would influence first year undergraduate nursing students' integration of theory to the practice setting of nursing	2.		**Design and Pilot of Research Instruments** (1) Clinical skills checklist and competency grading scales used in the OSCE. (2)Design and pilot of the practice based learning aid
2. To measure the level of clinical skills competence among first year undergraduate student nurses following simulation-based training prior to clinical placement.	3.	**Stage 1**	**Collection of OSCE Data** **(Clinical Skills Laboratory; CSL)** Clinical skills checklist and recorded competency levels
3. To explore the influence of a practice based learning aid on student participants competency in clinical skills and learning.	4.	**Stage 2**	**Collection of Quantitative and Qualitative data from Practice based learning Aid.** **(Clinical Placement)** Clinical skills checklist and recorded competency levels ⟷ Written reflection
	5.		**Collection of Field Data** **(Clinical Placement)** Researcher observation and student observation clinical skills checklist and competency levels
4. To explore and describe first year undergraduate student nurses' perceptions of the influence of a practice based learning aid on clinical skills competency transition from novice towards competent practitioner.	6.	**Stage 3**	**Collection of evaluative questionnaire data**
	7.		**Analysis of evaluative questionnaire data**
	8.		**Design and collection of focus group data**
	9.		**Answering the research questions** Analysis, interpretation and integration of quantitative and qualitative data

Figure 2 shows how the design and piloting of the research instruments directly links to meeting objective 1 which was to develop a practice based learning aid that would influence first year undergraduate nursing students' integration of theory to the practice setting of nursing. Objective 2 was to measure the level of clinical skills competence among first year undergraduate student nurses following simulation-based training prior to clinical placement and is linked directly to the collection of OSCE data stage of the study design (Figure 2). The third objective was to explore the influence of the practice based learning aid on student participants' competency in clinical skills and learning. Figure 2 shows how this objective was linked directly to the collection of both quantitative and qualitative data generated from the practice based learning aid and on the collection of field data from the researcher and students observation in clinical placement. The qualitative data generated from the practice based learning aid also contributes to meeting Objective 4 (Figure 2) which aimed to explore and describe first year undergraduate student nurses' perceptions of the influence the practice based learning aid on clinical skills competency transition from novice towards competent practitioner. The data generated from the questionnaire and from the focus group completed the contribution to meeting objective 4 (Figure 2) and the final stage of analysis, interpretation and integration of the data leads to answering the research question.

In summary, a mixed-methods design was best served to answer the research question that a single qualitative or quantitative design would be unable to do. The argument is that that the sum of the quantitative and qualitative research approaches used is greater than either approach alone (Creswell and Plano Clark, 2011). A major strength of the mixed method design is that it allows different yet complementary data on the same topic to be collected from both strands, thereby bringing together the different strengths and non-overlapping weaknesses of quantitative and qualitative methods (Polit and Beck, 2014). The data sets generated in the mixed methods design are compared, related and then interpreted together providing a more complete understanding of the students' learning experience and competency development (Creswell and Plano Clark, 2011).

3.5 Sampling and Recruitment

This section describes how the original sample of 27 undergraduate nursing students was selected and recruited for the study. In identifying the population for the study, issues of access, resources and efficiency were considered. The study was carried out at one third-level College in Ireland, where the researcher is currently employed, along with its partnered healthcare institutes; the consequent ethical considerations are discussed in section 3.9. All current undergraduate nursing students in year one of the General Nursing programme at the college were identified as the study population, due to their salience to the subject matter under enquiry (Patton, 2002). Sample selection for the study was guided by Onwuegbuzie and Collins' (2007) framework for developing sampling designs in mixed-methods research. They identify sampling schemes as being either probability (random) sampling, used predominantly in quantitative studies; non-probability (non-random) sampling, predominantly used in qualitative studies; or some combination of both. The sampling design and sampling scheme are considered after the goal of the study has been determined and the research objectives, research purpose, research questions and research design have been agreed (Onwuegbuzie and Collins, 2007). The goal in this study was not to generalise to a population, but rather to obtain insight contextually into the students' learning experiences of the educational approach and to explore its influence on undergraduate nursing students' clinical skills competency in the transition from novice towards becoming a competent practitioner. In this research a non-random method was used, described as available sampling (Patton, 2011). Participants are selected from those most readily available and suited to the research objectives. For the focus group, a purposive sampling method was justified and used to meet the needs of the qualitative goals of the study. The purposive sampling scheme (non-probability) allowed for the selection of participants who had particular features or characteristics which enabled detailed exploration and understanding of the central themes (Ritchie and Lewis, 2003).

The current study required the sample to be selected from student nurse participants who would experience the educational approach implemented in the study, including the newly developed practice based learning aid, in clinical

practice. The sample was then used to explore and evaluate the influence of the educational approach on the retention and transfer of clinical skills competency, as well as to illuminate and inform the understanding of the learning processes and experiences involved in clinical skills competency transition.

Controlling characteristics for available sampling included only first year general nursing students as they meet Benner's (1984) novice practitioner criteria. The novice has little or no clinical experience, lacks confidence to demonstrate safe practice and requires continual verbal and physical cues (Benner, 1984). Selecting novices for the study allowed an initial level of competency to be identified. Later measures of competency provided an indication of how students progressed along the competency scale and how the practice based learning aid used influenced this progression. The selection criteria identified for the sample characteristics was therefore identified as follows:

- Participants had to be registered at the named third level institute as a first year student nurse on the BSc Nursing in General Nursing degree programme.

- The students were required to sign an informed consent form (Appendix 3) stating that they were willing and able to participate in the study. The consent required the student to engage in the educational approach incorporating simulated learning, OSCE and using the practice based learning aid. Students were also asked to consent to being observed in practice and be willing to complete the evaluative questionnaire and participate in a focus group if required.

- Any student unable to meet the criteria would have to withdraw from the study.

When selecting the sampling frame, consideration was given to the sequential nature of the qualitative and quantitative strands of the study and the relationship between the samples (Onwuegbuzie and Collins, 2007). The sequential nature of generating the obtained competency level followed by reflective comments within the practice based learning aid determined that the same student participants were included in the sample for both the quantitative and qualitative components during this phase of the study. Furthermore the sequential nature of the exploratory follow up required the purposive sample for the focus group to be drawn from the original participants in the study.

All students who were currently registered on the first year BSc in General Nursing programme at the selected third level college were invited to a preliminary information session outlining the proposed study. Ethical consideration demanded that all the students had to be offered the opportunity to benefit from the educational approach being implemented and further justifies the available sampling method use for the quantitative strand of the study. Those selected for the sample would be required to participate for a full 12 months, providing rich data related to understanding the students' learning in a range of settings during this time frame. Key information was included in the consent form (Appendix 3) and provided to the students so that they could make an informed decision whether to participate or not. This provided a uniform approach to the study (Gerrish and Lacey, 2010). Students were also and reassured regarding confidentiality of the information provided and of their anonymity (Moule and Goodman, 2009). Information was also provided as to the potential importance and relevance of the study to nursing practice and students were encouraged to participate. Establishing the importance of the research to the students and to others involved also helps to ensure a high response rate (Gerrish and Lacey, 2010). The nature of the involvement required of students was also outlined to potential participants and they were provided with an opportunity to ask questions or voice any concerns.

The sample size was determined by the number of students who agreed to participate. From an initial total cohort of 45 undergraduate general nursing students, 32 volunteered to participate in the study. To pilot test the data collection tools a small sample of people with similar characteristics to those in the full study was required (Watson et al, 2008). All 32 participants' names were therefore put in a hat and a random sample of five students was selected to participate in the piloting of the data collection instruments. These instruments included the structured observation record used in the OSCE (appendix 4), the practice based learning aid otherwise known as the RCCSC (appendix 6) and the evaluative questionnaire (appendix 7). The five students who participated in the pilot phase of the study were then excluded from the rest of the study, due to the potential for bias (Moule and Goodman, 2009). Likewise, the data collected were excluded from the main results and are reported separately in section 3.9 (Gerrish

and Lacey, 2010). The remaining 27 participants provided the sample used for collecting data at the OSCE; during clinical placement using the practice based learning aid; researcher observation during clinical placement; and the evaluative questionnaire. A nested sample was also selected from this group to participate in the focus group.

The nested sample required the selection of a subset of participants who were representative of those from the earlier quantitative phase, in that they had experienced the educational approach implemented in the study and had completed the evaluative questionnaire (Onwuegbuzie and Collins, 2007). From these 27 participants a nested sample of 11 participants agreed to participate in the focus group.

The participants were allocated across four different hospital sites partnered with the third level college. This ensured a variation in terms of regional location and the nature of the clinical experience providing a level of diversity in clinical placements. Such diversity helps to the effect of the educational approach could be explored effectively (Onwuegbuzie and Collins, 2007).

3.6 Data Collection Instruments

This section provides details of the data collection instruments used in both the quantitative and qualitative strands of this mixed-methods study. The conceptual framework (Figure 1) underpinning the educational approach for this study was operationalised by implementing a structure and process that incorporated a theoretical class followed by simulated learning, OSCE and the use of a practice based learning aid while on clinical placement. The first collection of data was during the OSCE and the instrument for recording the level of clinical skills competency obtained in the OSCE is discussed in section 3.6.1. This was followed by a discussion on the design of the practice based learning aid or RCCSC which collated both qualitative and quantitative data during clinical placement (3.6.2). Section 3.6.3 then discusses the design of the evaluative questionnaire issued to participants on their return to college, having completed clinical placement. The final section (3.6.4) provides details of the focus group

schedule. Section 3.7 describes how each of the instruments was piloted and outlines any subsequent changes made.

3.6.1 Recording clinical skills competency levels obtained in the OSCE

In order identify the level of skills acquisition and the level of clinical skills competency attained following the theoretical and simulation-based aspects of the educational approach, the students in this study had to complete an assessment process known as an Objective Structured Clinical Examination (OSCE). A detailed discussion on the origins of the OSCE is provided in Section 2.1.1 of the literature review, but briefly it is a form of structured observation which generally involves the use of a checklist to record and objectively measure those components deemed necessary to demonstrate competence in a particular clinical skill (Brannick et al, 2011). In the current study the structured observation record for the six skills identified for assessment in the OSCE was designed specifically for the study and incorporated into the curriculum to form part of the assessment at the end of year one. As this study was carried out in the context of an ongoing undergraduate nursing education programme the researcher was unable to control the selection of skills to be assessed. The six clinical skills were determined by the programme leader, based on the learning objectives and the content of the curriculum for the first year of the undergraduate general nursing programme. These clinical skills comprised:

- Hand washing
- Blood pressure recording
- Urinalysis
- Intramuscular injection
- Administration of a nebuliser
- Mouth care.

Moules and Goodman (2009) argue that using a structured data collection tool can improve reliability in observation recordings because the researcher is making judgements about particular behaviours or events within defined parameters. Two key areas were considered in the design of the structured observation record for this study. The first was the content: the criteria needed to demonstrate that all the necessary steps were taken to complete each of the six

skills identified for the study. The second was the level of performance that would determine how competent the student was in their performance of each of the six skills; these competency levels represent the baseline competency scores.

The structured observation criteria for each of the six skills was constructed with reference to core texts identified in the curriculum document for teaching and learning clinical skills. They included the *Royal Marsden Hospital Manual of Clinical Nursing Procedures* (Dougherty and Lister, 2008) and *Essential Nursing Skills* (Nicol et al, 2008). The former was also used by Meechan et al (2011) when developing the OSCE protocol for their research. Face and content validity of the identified criteria was established through critical and evidence-based reviews of the literature, both during its initial development and its evaluation by experts in the field of nursing (James, 2012; Haider, 2011; Carlisle, 2011). A structured observation performance checklist in the form of a 'tick box' was designed for each of the six clinical skills used in the study to determine whether each procedural step was completed by the student during their performance (Appendix 4). As this research forms the independent study requirement in partial fulfilment for the award of Doctor of Education, the initial draft and design of the instrument was completed by the researcher. Following this initial design an 'expert consensus technique' was used to determine the content validity (Cant et al, 2013; Moule and Goodman, 2009).

An expert panel was set up to review both the structured observation record used in the OSCE and the practice based learning aid used in clinical practice in order to reach an agreement on the structure and content of each. The inclusion criteria set for the group was that they had to hold key positions of strategic importance to the research aims and be familiar with the curriculum structure and content. Three members of faculty with experience in clinical teaching (including the module leader) and two senior clinical staff were asked to form the expert panel, along with the researcher. A doctoral colleague not associated with the general nursing programme but with experience and expertise in clinical education was also approached to act as an independent reviewer of the work produced by the group. The researcher facilitated the review and acted as a resource on the origins of the observation record and its purpose related to competence

development, as well as providing the rationale for its conclusion in the research study (Moule and Goodman, 2009). Using a panel of faculty and clinical staff to establish the validity of assessment tools for assessing clinical competence of pre-registration nursing students is recognised as a common procedure in the published literature (Cant et al, 2013). The original draft of the OSCE observation record for each of the six skills, including the competency grading scale, was put before the group. Each member was asked firstly to review the criteria for the procedural steps in each skill and then review the performance criteria for the competency grading scale. The researcher acted as a facilitator and each member of the panel provided verbal comment in turn without interruption. All comments were written on a flipchart followed by a discussion on each comment, facilitated by the researcher, until consensus on the structure and content was reached. For most of the skills, minimal changes were made relating to the performance criteria as these were based on published procedural guidelines (Dougherty and Lister, 2008; Nicol et al, 2008). One key change related to hand washing as part of the performance criteria for each of the five other skills: this could potentially lead to each student being assessed up to six times on the skill of hand washing. It was therefore agreed that during the OSCE it would not be necessary to repeat hand washing once it had been assessed separately; the student would be expected to state at the appropriate time during the other five skills the stage at which they would perform a hand wash.

Using the observation sheet developed for the skill of hand washing as an exemplar (Appendix 4), the left hand column lists the performance criteria required to complete the skill. The student is observed performing the skill and the appropriate box on the right hand side is ticked depending whether or not the criteria was performed. An additional column titled ‘performed but not fully competent’ was added following discussion in the review panel to allow for those times when a student completes a step but is hesitant in doing so and could therefore not be deemed as performing competently. This resulted in three columns for the checklist component when checking if a step in the procedure was performed: i.e. ‘Performed competently’, ‘Performed but not fully competent’ and ‘Not performed or incompetent’. When consensus was reached the format

agreed on was piloted (3.7) before being fully implemented and used for the study (Gerrish and Lacey, 2010).

Following completion of a skills performance in the Clinical Skills Lab (CSL), each student would be afforded the opportunity to reflect on their performance and provide written reflective comments. These comments are considered by the examiner when determining if the student's reflection on their performance was satisfactory or not depending on their ability to identify any errors or omission and also help the examiner to determine the overall competency grade of the student's performance in the OSCE.

The final section in the skills observation sheet (Appendix 4) is the competency grading scale component. This was developed based on the work of Dreyfus and Dreyfus (1980), the seminal work of Benner (1984), who adapted the Dreyfus Model to explain the development of nursing skills, and the later work of Nicol (2008). The competency scale also had to link to the competence framework provided by the Nursing Board (An Bord Altranais, 2005) that incorporates the appropriate level of knowledge, skills and attitudes required from the novice student. The competency grading scale component provides a form of objective assessment of the student's competence using a Likert-type scale indicating how well each of the tasks was performed (Major, 2005). The level descriptors for each of the competency grades used in the observation sheet is provided in Appendix 5 and links each grade with Benner's (1984) Stages of Clinical Competence. The initial draft of the level descriptors was provided by the researcher drawn from the work of Nicol (2008) and presented to the expert panel described previously for discussion and consensus. These were then piloted as discussed in section 3.7.

The competency scale used in the OSCE, ranges from 'Not competent', 'Partially competent', 'Competent' to 'Fully competent'. This scale was added to bottom of the structured observation sheet for each skill with a tick box beside each one for the examiner to indicate the level of competency achieved. It must be noted that these competency levels have been adapted to be taken into context for first year nursing students. Benner (2004) suggests that first year nursing students are at

the novice stage and in fact only reach the stage of advanced beginner when they become new graduates. The nurse only becomes a competent practitioner after a few years in practice; proficiency is viewed as a transitional stage on the way to expertise, whilst the expert nurse develops intuitive links between seeing and responding to whatever clinical situation they find themselves in (Benner, 2004). This study recognises that competency in nursing is more than the ability to perform clinical skills at a competent level. Benner (2004) referred to the fact that because the Dreyfus model of skills acquisition is a situated and descriptive phenomenological account of skills development over time it allows that a practitioner may be at different levels of skill in different areas of practice, based on the particular practitioner's background experience and knowledge. Operationally, therefore, the competency levels in this study apply directly to the level of clinical skill performance at the time, rather than a measure of the student's overall competence as a practitioner.

Once satisfied of the content validity, the Clinical Skills Observation Records had to be tested for reliability. Measures taken to test for inter-rater reliability between student and observer are outlined in the pilot study (Section 3.7). Further measures were taken to. All results from OSCEs are digitally recorded on camera for quality assurance purposes and for internal and external moderation of examinations within the Department of Nursing. Permission was granted by the participants in the study to access their recording to test for inter-rater reliability between faculty members of the structured observation record used in the OSCE. A random sample of five of the participants' recordings were selected by the researcher for pilot testing and were subject to scrutiny, which is described in section 3.7. Each recording was viewed by the researcher and marked, using the same structured observation record as that used by the faculty member. The marks were then compared with the student's original OSCE marking sheet. There was an overall percentage agreement of 84%, providing a 'very good' level of agreement demonstrating reliability of the observation record developed for use in the study (Marston, 2010).

3.6.2 Practice based learning aid

The practice based learning aid known as the Reflective Checklist for Clinical Skills Competence (RCCSC) was specifically designed for this study and is based

on the conceptual framework previously discussed (Section 3.2, Figure 1). A hard copy is provided in the pocket at the back of the thesis along with the print version available to view in Appendix 6. The thinking underpinning the learning aid relates directly to the Benner's, (2004) argument that developing competence in clinical skills is dependent on experiential learning. Conceptually, the RCCSC is the synthesis of three components that supplement prior teaching and learning in the classroom and in the simulated setting. It was designed to act as a catalyst in the transition of learning and competency development in clinical practice. The RCCSC is quite similar to the observation sheet used in the OSCE in that the key components include the clinical skills checklist and the competency grading scale designed for the OSCE (3.6.1). Additionally the RCCSC incorporates the process of reflection. The students were encouraged to use Gibbs' (1988) reflective cycle, the reflective model that is used in their curriculum. This area of reflection is subjective in nature and therefore generates qualitative data as opposed to quantitative. Students were instructed to engage in reflection both in and on their performance while in the practice setting and space was provided to allow for any written comment that they felt informed their learning. This is a key element in the conceptual framework of the study and in the overall structure and process of the educational approach used.

The rationale for incorporating the same structured observation component of the OSCE into the practice based learning aid was to ensure the compatibility of data collated for comparison across the various stages of the study (Gerrish and Lacey, 2010; Parahoo, 2006). It helped identify the level of retention in clinical skills competency before, during and after clinical placement. For the reasons previously outlined (3.6.1), the researcher was restricted to incorporating the six pre-identified clinical skills used in the OSCE (hand washing, blood pressure recording, urinalysis, intramuscular injection, administration of a nebuliser and mouth care) into the practice based learning aid.

The reader is referred to the hard copy printed in booklet format available in the pocket at the back of the thesis. Taking the skill of hand washing as an exemplar, the left inside page provides the clinical skills checklist component, listing the performance criteria for the skill in the left hand column and providing a tick box for up to four performances in the right hand columns. Once a skill had been

performed in clinical practice, students were instructed to reflect on their performance (using a model of reflection) and tick the criteria that they performed and identify any that they may have omitted. Attention to the design, which combined the three components within the single learning aid, was necessary in order to help facilitate the ease of completion of all the components and to generate truthful data (Watson et al, 2008). The aim was to provide an aid that was learner-centred and that could be used by students in the practice setting to explore their clinical skills experience in order to enhance learning and practice. The practice based learning aid is intended to be completed by a student nurse without assistance and therefore the design needed to incorporate predetermined and standardised items (Appendix 6) to help to ensure that the sub-item determinants of competence can be quantified for easier analysis and, in turn, help to provide a fair degree of reliability (Burns and Grove, 2007).

The reflective component and the competency performance grading scale, as described in section 3.6.1, are on the right hand page (see pocket at the back of the thesis). These are numbered 1-4 to correlate with the four observation checklists on the left page. The synthesis of the process of reflection with both the clinical skills checklist and the competency performance grading scale within the practice based learning aid aims to encourage each student nurse to reflect on their experience every time they complete one of the six clinical skills, in order to help promote reflective practice. Upon reflection the student would identify if they performed all the criteria listed, grade their performance using the level descriptors provided on the back page of the practice based learning aid and include any written reflective comment that might provide insight into their performance and inform future learning. The validity and reliability of the skills checklist and the competency grading scale using an expert panel is detailed in section 3.6. The same panel and process was also used to review the learning aid. There was considerable debate surrounding the number of assessments required for each skill; some members considered three assessments were enough to achieve full competence, while others believed that it should be five or more. The researcher provided a summary of some of the key literature available and eventually a consensus was reached on providing up to four assessments, while acknowledging that four may not be necessary for all students and all skills.

Discussion also ensued regarding the available space for written reflective comment. Some panel members believed that more space should be provided to allow for detailed comment. However a key aspect of the learning aid was that it was designed to be used in the practice setting, therefore it should not be cumbersome and it should be user friendly. Providing too much space might discourage students from using the aid. The focus was not so much on writing but encouraging reflective thought. Agreement was eventually reached: three lines per assessment should be provided and students should be instructed to engage in the reflective process.

The learning aid is a synthesis of three instruments including the performance checklist and the competency grading scale which provide an indication on the level of competency attained when performing clinical skills in the practice setting, in addition to the section for written reflection which provide a means of recording reflective thoughts. The practice based learning aid is a key component in the structure and process of the educational approach designed to enhance the transition along the clinical skills competency scale from not competent to fully competent. The combination of objective and subjective data within the practice based learning aid justifies the need for a mixed-methods design used in the study (Creswell and Plano Clark, 2011). The design of the learning aid is multi-dimensional in that it incorporates the cognitive, affective and psychomotor elements of clinical skills. Consideration was also given to ensuring that the competency scale was not too lengthy, in order to improve the response rate (Watson et al, 2008). Furthermore, in order to make recommendations for utilising the RCCSC in practice it was essential to test and establish its reliability and validity (Williamson, 2005; Clark et al, 2004). As previously stated, the validity and reliability of self-assessment presents a challenge. The use of the consensus technique, the content validity issues discussed in section 3.6.1 and the measures outlined in the design of the practice based learning aid in this section help to strengthen its validity and reliability. Further measures, including the piloting of the research instruments used in the study, are outlined in Section 3.7 and details of how issues of reliability regarding the practice based learning aid were addressed are discussed in section 3.6.

3.6.3 Evaluative questionnaire design

An evaluative questionnaire (Appendix 7) was designed to collect data regarding students' perceptions of the benefits of the practice based learning aid used in the study. Questionnaires are widely recognised as research instruments for collecting specific information that will provide answers to the research question (Gerrish and Lacey, 2010; Oppenheim, 2000). The questionnaire was designed partly to explore and quantify students' evaluations and partly to collect information on attributes, attitudes, beliefs and experience; these would include feelings and perceptions, behaviour and activities relating to their experience of the education approach and specifically the use of the practice based learning aid (Parahoo, 2006). The questionnaire was piloted and the final version used in the study can be viewed in Appendix 7. The findings from the questionnaire provide an insight into student's perceptions of the changes in the recorded competency performance levels across the time scale of the study, and also provide a means for triangulation to strengthen some of the weaknesses arising from using a single data set (Creswell and Plano Clark, 2011).

The questions were designed to explore the variables considered as relevant to the key concepts identified from the literature (Parahoo, 2006). Krosnick and Presser (2010) support Oppenheim's (2000) argument that questions at the beginning of a questionnaire should explicitly address the topic of the study as initially explained to the respondent, and that topics should be grouped together proceeding from the general to the specific. The first section of the questionnaire therefore contained questions that related to biographical information, which provided necessary data to allow for comparisons at the analysis stage (Krosnick and Presser, 2010). The next section related to questions addressing students' perception of their competence, both before and after completing their clinical placement. These helped to indicate any influence the education approach may have had on their clinical skills competency. A four-point competency rating scale was used to provide an indication of students' perceived competency level. The points on the scale were the same to those in the OSCE and in the practice based learning aid, ranging from Not Competent, to Partially Competent, Competent, and Fully Competent (See Questionnaire Sections A and B in Appendix 7). To strengthen reliability and validity, consideration was given to ensuring that the

scale used covered the competency measurement continuum, that it was ordinal in fashion, progressing from Not Competent to Fully Competent, and that both the students and the researcher had a precise and stable understanding of the meaning of each point on the scale (Krosnick and Presser, 2010). Student respondents were accustomed to the competency performance scales from their OSCE experience and from using the practice based learning aid in clinical placement. Using a familiar scale is accepted as a technique to make it easier for respondents to identify the conceptual divisions between each point; it also helps to ensure consistency in responses and to reduce ambiguity (Parahoo, 2006).

When designing a questionnaire Krosnick and Presser (2010) argue that questions on topics which are deemed sensitive, or which might make respondents uncomfortable, should be placed at the end of the questionnaire. Questions related to the evaluation of the practice based learning aid as part of the overall educational approach used in the study, were therefore included in Section C to encourage a truthful response from the students. This section addressed questions regarding factors that might be deemed to have an influence on competence and questions related to the circumstances in which they used the learning aid in practice (Oppenheim, 2000). A five-point Likert type scale - recognised as one of the most widely-used itemised scales - was used to generate responses to a series of questions related to the evaluation of the learning aid (Gerrish and Lacey, 2006; Malhotra, 2006; Oppenheim 2000). The points on the scale were Strongly Disagree, Disagree, Neither Disagree or Agree, Agree and Strongly Agree. Statements were phrased in a favourable fashion, using a scoring procedure from 1 for Strongly Disagree to 5 for Strongly Agree, which helps provide consistency and reliability (Malhotra, 2006). The validity and reliability measures used in developing the four-point scale for measuring perceptions of clinical skills competency described above were also applied when developing the questions for the five-point Likert scale used for evaluating the learning aid.

3.6.4 Focus group schedule

The focus group is part of the qualitative strand of the explanatory-sequential design used in this study. Qualitative data is collected after the analysis of the

data from the quantitative strand (Creswell, 2009; Tashakkori and Teddlie 2010). The focus group interview schedule (Appendix 8) was therefore based on the analysis of the quantitative data from the OSCE, the practice based learning aid, the researcher's observations and the evaluative questionnaire. The schedule was designed to elicit specific responses to allow further interpretation and explanation of the results from the evaluative questionnaire and to gain a deeper understanding of the students' learning experience from the students' own perspectives, rather than standard open-ended questions traditionally associated with qualitative research (Creswell and Plano Clark, 2011). The philosophical argument for adopting this approach in the current study was presented in section 3.3 and the procedure for carrying out the focus group is outlined in section 3.8.3. The next section discusses the piloting of the data collection tools used in the study.

3.7 Pilot Testing of the Data Collection Instruments

The pilot group identified at the sampling and recruitment stage of the study (see section 3.5), was used to test the data collection instruments before beginning the main study (Sarantakos, 2005). These included the structured observation clinical skills checklist and competency grading scale used in the OSCE, the RCCSC and the researcher's observed performance in clinical practice. The pilot group also tested the evaluative questionnaire for clarity of instructions, to ensure that questions were relevant, robust, clear and unambiguous (Gerrish and Lacey, 2010) and to identify any potential administrative and organisational problems related to the main study (Krosnick and Presser, 2010). The five students selected for the pilot test were not included in the main study, as Moule and Goodman (2009) suggest that the pilot process may influence their behaviour or responses.

Each member of the pilot group was given time to familiarise themselves with the documents and were provided with detailed instructions on how to self-complete the clinical skills checklist component, the competency grading scale and the written reflective component of the practice based learning aid. The pilot-test enabled the researcher to review the clarity of the completion instructions provided (Moule and Goodman, 2009). The pilot group completed a mock OSCE

where each performed the six skills, included in the learning aid. During this time a staff member trained in assessing students using the structured observation record used in the OSCE acted as an independent observer and marked the student, following the instructions as provided to the students and using the competency grading scale provided. On completion of the OSCE, the student reflected on their performance using the practice based learning aid indicating what they believed was their obtained competency level. The obtained competency level was then directly compared with the competency level recorded by the examiner to check for inter-rater reliability.

To assess the extent of agreement between two or more assessors a Kappa value is normally used (Marston, 2010). A score of 1.00 indicates 100% agreement between observers, whereas a score of 0.60 (60% agreement) or lower suggests that 6 out of 10 events observed will be scored the same and is viewed as being less than desirable (Moule and Goodman, 2009). The pilot study did not have sufficient numbers to generate a Kappa value in order to determine the inter-rater reliability; however, comparisons between the competence score awarded for each of the skills by the five students in the pilot group and those awarded by the independent observer are shown in Appendix 9.

The table in Appendix 9 shows the ratio of agreement between the responses of the two markers. From a total of 30 assessments, the independent observer and the student were in agreement with the score awarded on 23 occasions and disagreed on seven scores. This provides an agreement percentage of 76.6% which indicates that the level of agreement is in the ‘good’ (0.61-0.80) category (Marston, 2010). There were two occasions where the examiner had awarded a competency level one higher than the student’s self-assessment and five occasions where the examiner had recorded a competency level at one level lower than the student.

Further investigation with the pilot group revealed that the main reason for the discrepancy was the interpretation of the competency level descriptors (Appendix 5). For example the Fully Competent (FC) level descriptor includes the phrase;

> …*any minor errors or omissions are quickly identified and corrected without any prompting*.

In the Competent (C) level descriptor, the phrase changes slightly:

> *… Any minor errors or omissions were identified and corrected although not always straight away. Technique may have lacked fluency but was satisfactory*.

It was identified that the reasons given by the student for marking at a lower level than that of the observer was that the student believed that there was a minor hesitation in their performance while they mentally processed the next 'step' in the procedure and therefore awarded them self a 'C' grade. The observer did not identify the hesitation as they could not detect what the student was thinking and, based on the independent observation, awarded an 'FC' grade. The opposite occurred when the examiner awarded a lower score than the student. In this case the observer felt that there was some hesitation in the fluency of the student's performance and awarded a lower grade than the student, who believed that there was little or no hesitation. In order to improve reliability, extra time was spent instructing students in the main study how to interpret the level descriptors for each competence grade.

All of the students were able to satisfactorily complete the written reflection component of the learning aid and commented on the fact that they were already familiar with Gibbs' (1988) reflective cycle, which is incorporated in a professional learning module that students have to undertake in year one of their programme of study; subsequently, no changes were made for the main study.

Having competed the pilot test of the OSCE observation record and the practice based learning aid, the post-test questionnaire (Appendix 7) was distributed to the pilot group to ensure that it was unambiguous enough for the students to understand and respond to the questions in the same way that others might do (Krosnick and Presser, 2010; Parahoo, 2006). The piloting process allowed for a reliable estimate of the anticipated completion time for inclusion in the written and verbal instructions provided (Oppenheim, 2000). The first draft of the questionnaire was provided to the pilot group in a small classroom, with the researcher present. This process mirrored the planned process for questionnaire administration in the main study. The group was asked to try and identify any

ambiguity in the questions or instructions. After completion, a discussion lead by the researcher ensued to identify the group's understanding of the questions asked, the rationale for the questions included and if there were other relevant questions that should be included (Sarantakos, 2005).

A few minor changes were made based on the feedback and discussion from the pilot group. The original initial section relating to personal and biographical information was moved to the end of the questionnaire, as the pilot group did not initially see the relevance of this information, and had expected to begin with questions directly relevant to the study. This has been previously argued as a consideration in questionnaire design (Oppenheim, 2000). Based on the comments from the pilot group, the layout and instructions for the four-point rating scale on perceived competency level before and after clinical placement was altered to make it more 'user-friendly' and unambiguous. Similar changes were made to the layout and instructions for the five-point Likert type scale used in the questionnaire for evaluating the learning aid. The changes were then reviewed with the pilot group, resulting in the completed questionnaire used for the main study (Appendix 7).

3.8 Data collection procedure

Having provided details of the design and piloting of the data collection instruments used in the study, this section provides a chronological description of the procedural steps used in both the conceptual and interpretative phase of the study. A visual model of the mixed-methods design used was provided in Figure 2 and also provides an indication of the procedural steps used in each of the qualitative and quantitative strands within the study**.** Table 1 below provides a colour coded time line for each of the stages including the design and testing of the research instruments.

DATE	DATA COLLECTION	RATIONALE
Sept 2008-Jan 2009	Design of the Practice Based Learning Aid	The Practice Based Learning Aid was informed by the theoretical framework identified from the literature and was created by synthesising a clinical skills checklist with the process of reflection incorporating a self-assessed competence grading score

Sept 2008-Jan 2009	Design of the observation tool used in the OSCE and for the Field Observations	The same tool used to measure and assess clinical skills competence performance in the OSCE was used during observations in clinical placement
Feb 2009	Pilot of OSCE/Field Observation tool	Two faculty staff members and five students from the original sample of 32 participants. The five students were used to pilot all the tools and subsequently were not included in the main study
March-April 2009	Pilot of Practice Based Learning Aid	Five students from the original sample of 32 participants
May 2009	Data Collection Stage 1: OSCE Data Collection	The remaining 27 students from the original 32 participants after the five used for the pilot were excluded.
May-Oct 2009	Questionnaire Design	Questionnaire was designed to evaluate the participants perceptions of using the Practice Based learning Aid and its effect on their clinical skills competence
Sept-Dec 2009	Data collection Stage 2: Practice Based Learning Aid Data Collection	Of the 27 students who agreed to participate in the study 19 returned their Practice Based Learning Aid . NB Not all students completed all aspects of the Practice Based Learning Aid
Oct 2009	Pilot Questionnaire	Five students from the original sample of 32 participants
Dec 2009	Data collection Stage 2: Field Observations	Of the 27 participants, 22 were observed by the researcher in clinical placement
Jan 2010	Data Collection Stage 3: Questionnaire Data Collection	Of the 27 participants in the study 26 questionnaires were returned
Jan 2010	Data Collection Stage 3: Focus Group Data Collection	Of the 27 participants in the study 11 were selected to participated in the focus group discussion
Data Collection Colour Key: Stage 1:  Stage 2:  Stage 3: 		

Table 1 Timeline for design, piloting and collection of data

Each of the three stages of data collection are discussed in the next section beginning with the OSCE.

3.8.1 Stage 1: OSCE data collection

The OSCE took place at the end of the first year of the undergraduate nursing programme, following simulation-based training in the Clinical Skills Laboratory (CSL) (Table 1). The competency level achieved at the OSCE for each of the six skills acted as a baseline competency level for the study and served to indicate the level of participants' skills acquisition and the level of clinical skills competency on completion of the theory and simulated learning components of the practice based learning aid.

Quantitative data was collected during the OSCE, using the structured observation record designed for the study, to determine and measure each of the 27 participants' competency level in each of the six clinical skills. Six OSCE 'stations' (Harden and Gleeson, 1979) were set up in the CSL. Each station

represented a simulated clinical skills scenario for one of the skills to be assessed: hand washing, blood pressure measurement, intra muscular injection, urinalysis, mouth care, and administration of a nebuliser. Students were informed one week in advance of the skills that were to be assessed in the examination to eliminate any disadvantage related to the timing of individual assessments. Students were provided with both verbal and written information regarding the OSCE (Appendix 10). At the beginning of each skill, the examiner read out the appropriate standardised instructions and was instructed not to interact further with the student except in the following circumstances:

1. Where they are required to act as qualified staff member for the checking of medications.
2. In the case of an emergency.

On completion, the student would move on to the next station and rotate through each of the six stations until all stations were completed. All examiners were trained in using the clinical skills structured observation tool and all OSCE assessments were digitally recorded for examination moderation purposes. Permission was gained from the student participants in the study for the researcher to view the video recording to ensure inter-rater reliability.

Having completed the OSCE, the students were provided with the opportunity to reflect on their performance and provide written comment on any key points from their reflection that might help identify any errors and omissions that could then be considered by the examiner when allocating an overall mark. The competency level attained provided an indicator of the effectiveness so far of the practice based learning aid on clinical skills competency.

3.8.2 Stage 2: Clinical placement

Students returned in September (Table 1) after a 3 month absence and began year two with a series of practice placements over a four-month period from September to December. These clinical placements provided the students with specialised experience in accident and emergency, maternity, paediatrics and operating theatre across four general hospital sites. Students were also allocated

to placements in specialised units to gain experience in both psychiatric nursing and in public health nursing. All the study participants attended a training and information session on how to use the practice based learning aid prior to the OSCE and again in the week prior to beginning clinical placement in September. The learning aid incorporates the same competency level record as that used in the OSCE, in order that direct comparison can be made at different stages of the study. The first recording for each of the skills using the RCCSC learning aid in clinical placement represents the pre-test score. This first competency level was then used to determine any change from the baseline competency level recorded at the OSCE. It was also used to compare with the post-test score, to determine any changes that occurred following the intervention.

During their clinical placement each student was asked to complete up to four self-assessments of their competency on each of the six identified clinical skills. However, the nature of the clinical placements meant that not all the student participants had the opportunity to perform all the skills in practice. For example, local regulations for the paediatric unit do not allow nursing students to administer IM injections to children and therefore students allocated to this unit were unable to perform this skill during their clinical placement. Furthermore, not all the student participants had the opportunity to complete four assessments for each of the skills; for example, few patients on the maternity ward required mouth care and a student might struggle to find one instance where a patient requires a particular skill while on that placement. These limitations are discussed further in section 6.5. Since not all students had the same number of skills completed it was not feasible to calculate an average. A variable called the Max RCCSC score was therefore calculated by identifying the highest competency level achieved for each student in each of the skills that they had the opportunity to perform in practice. The complex nature of the skills ensures that competence could not be achieved by chance. The Max RCCSC score therefore represents the competence level achieved in clinical placement and was then compared with previous competency levels for each of the clinical skills. The recorded competence performance grade for each of the skills in the RCCSC represents the quantitative strand of this phase of the study.

The learning aid also allowed qualitative data to be collected from the students' written reflective comments. A key concept of the learning aid is the synthesis of a clinical skills checklist with a competency grading scale and the process of reflection. Student participants were required to reflect on their performance in each of the clinical skills, using Gibbs' (1980) reflective cycle. Space was provided for written comment based on their reflection (See Appendix 6). The written reflective comments provided data for the qualitative strand of the mixed-methods design during this phase of the study. The purpose was to generate rich qualitative data providing insight into participants' thinking and information on circumstances or events that might have had a direct impact on their skills performance. The written reflections were transcribed and analysed, as described in section 3.12.2 below.

Post-test data was collected during the final two weeks of the students' clinical placement (Table 1). There were five student participants who could not be observed due to reasons outside the researcher's control therefore, from the total of 27 student participants in the study, 22 were observed by the researcher performing two clinical skills. Only data from the 22 students who were observed in practice were used when comparing these competency levels with baseline and pre-test competency levels.

In order to try and capture as real a scenario as possible, the students were informed that the observation would take place during their Year 2, Semester 1 clinical placement, but they did not know the exact day and time until the researcher arrived, unannounced. Permission was sought to access the clinical area from the respective Directors of Nursing (DON) and the appropriate Clinical Nurse Manager (CNM) (Appendix 11). Once permission had been obtained, the appropriate unit manager was contacted during the final two weeks of the placement to arrange an appropriate date and time for the observation to take place. Depending on the opportunity available at the time, and adhering to the ethical guidelines (3.9), an appropriate skill (incorporating hand washing) was identified for the student to perform while being observed. Where the performance might involve observing the student's skills whilst interacting with a patient, verbal consent was gained from the patient prior to the observation taking place and an information sheet explaining the study to the patient was also

provided (Appendix 12). The skills of IM injection and mouth care were identified as ‘screened’ skills, which required the curtain screens around the bed to be pulled in order to maintain the patient’s dignity. Adherence to the ethical agreement for the study (3.9) meant that the researcher was not able to observe these two skills being performed in clinical practice. During the two-week period of field observations the opportunity to observe students performing the skill of administering a nebuliser did not arise. Therefore the two skills observed by the researcher included hand washing plus one other skill, either urinalysis or blood pressure recording.

Each of the 22 students available was observed and a competency level was recorded by the researcher. The merits of alternative approaches that might reduce researcher bias were given careful consideration however, due to practical reasons and to ensure internal consistency, the use of the researcher to collect observation data was selected as the preferred method.

After completing the clinical skill the student was provided with ten minutes (the time allowed in the OSCE) to reflect on their performance, complete the clinical skills checklist and indicate their competency level. The completed documents were handed to the researcher, coded and stored for analysis. The researcher-observed competency level and the student’s observed competency level were then compared during the analysis phase of the study for inter-rater reliability. The competency levels were also used for pre- and post-test data analysis.

On return to the college a box was provided for participants to submit their practice based learning aids, regardless of whether or not they were fully complete. All of the learning aids were coded and each student was provided with a code number so that the baseline, pre-test, post-test and observer data related to that student could be compared and provide a record of the qualitative written reflective comments. The original data and details of the codes were stored in a locked cabinet and only accessed by the researcher.

3.8.3 Stage 3: Post-placement data collection

This section describes the procedural steps during the post-placement stage of the study (Table 1) and includes the evaluative questionnaire and the focus group. Following the completion of their clinical placement, the student participants returned to the college for the final semester of their second year. During this period, time was allocated at the end of a lecture to distribute the questionnaire (Appendix 7) described in section 3.6.3, which was designed to evaluate students' experiences of the educational approach implemented in the study and their experience of using the practice based learning aid. It was also designed to provide a measure of their perception of how the practice based learning aid influenced their learning. The questionnaire was handed to each of the participants and explanations and instructions were read out to ensure informed consent (Appendix 3). All student participants (n=27) were asked to complete every question in the questionnaire, even if they did not get the opportunity to complete all the skills while on clinical placement or did not submit their completed learning aid booklets. Students were asked to tick the rate on the scale that best reflected how competent they felt in each of the skills before they commenced their second year clinical placement. This was then repeated to assess their perceived competency level after completing clinical placement. The educational approach and the practice based learning aid were evaluated by asking, students to tick the appropriate box that best reflected their response to the question. Students were asked to leave the questionnaires, whether completed or not, in a collection box at the door. Responses were then coded and analysed as described in section 3.11 below.

The final stage of data collection was the focus group, part of the qualitative strand of the explanatory-sequential design of the study (Table 1). The focus group was chosen over the interview method because of its ability to gather information from a number of participants at one time (Patton, 2002); moreover it would encourage the participants to interact, enhancing the quality of the information provided (Krueger and Casey, 2009). The purpose was to have a representative sample from those who had experience of using the practice based learning aid and who had completed the questionnaire. In this way they were in a more informed position to provide rich data relating to the learning

experiences and learning processes involved and further insight into the responses provided in the evaluative questionnaire (Ritchie and Lewis, 2003).

In keeping with the explanatory-sequential design this could only be completed after the analysis of the quantitative data. All the study participants were asked if they wished to take part in the focus group. Subsequently, a total of 11 students volunteered and, since this approximated to the typical group size of 6-12 (Patton, 2002), all were included and only one focus group session was used. It is recognised that relying on volunteers can bias the findings (Parahoo, 2006) but the choice of the purposeful sampling method was to maximise the richness of the information obtained and the volunteers met the criteria. An hour was identified as 'free time' on the students' timetable and a classroom was identified as a venue. The room was set with the researcher acting as facilitator in a central position and students seated in a semi-circle. The focus group interview was digitally recorded and transcribed *verbatim* as recommended (Boeije, 2010; Krueger and Casey 2009). The full transcript is provided in Appendix 13.

It was important as the researcher not to allow any one or two participants to dominate and allow others in the group to share their view (Ritchie and Lewis, 2003). Throughout the interview the researcher took time to check with other participants if they agreed with what was being said. This not only encouraged all members to contribute to the discussion but also acted as a form of member checking, a key technique for establishing the credibility of the data (Lincoln and Guba, 1985), which helps to ensure the authenticity and truthfulness of the data (Patton, 2011). Each respondent was provided with a unique identity code, different from that used for the self-assessment analysis, thereby adhering to the confidentiality assurances provided to the students at the outset of the study. The session lasted for 52 minutes using a semi-structured interview schedule designed to elicit a focused discussion on key topics identified from the questionnaire, rather than an a more open-ended discussion. The focus group generated qualitative data that provided a deeper understanding and exploration of the results from the quantitative strand (Creswell and Plano Clark, 2011). Details of the analysis methods are provided in section 3.12.1.

3.9 Ethical Considerations

In educational research ethical issues can arise because of the fiduciary relationship that exists between the lecturer and the student; violations in that relationship can occur because of the dual roles of educator and researcher (Ferguson et al, 2004). This study adhered to the ethical guidance provided by the Irish Nursing Board (An Bord Altranais, 2007) requiring nurse researchers to consider the ethical principles of: respect for persons/autonomy; beneficence and non-maleficence; justice; veracity; fidelity; and confidentiality.

It was important to consider the fiduciary relationship that existed between the researcher, as a lecturer in the undergraduate nursing programme, and the student participants in the research. The nature of the research question made student participation essential and the study could not be conducted with other groups of participants, therefore the ability to consent voluntarily may have been compromised (Ferguson et al, 2004). To reduce any element of coercion, the researcher gained permission from the head of department to withdraw from lecturing duties for this cohort of students, thereby reducing the level of power in the educator/student relationship (Condell and Begley, 2012). A prepared script explained the nature and purpose of the research, informed the students of their right not to participate, and confirmed they could withdraw from the study at any time, without sanction. All students who agreed to participate in the study completed a written consent (Appendix 3).

The ultimate goal of the research is to improve the learning situation for students. In considering the principle of non-maleficence, therefore, the students were informed of the personal and professional benefits of engaging in the educational approach in order to offset any inconvenience caused. Careful consideration and testing was carried out to ensure the practice based learning aid could be completed with ease, and to establish the length of time it should take (Burns and Grove, 2007). Reassurances were also provided that all data supplied would be treated in strict confidence (Gerrish and Lacey, 2006).

A key element to the study was the observation by the researcher of the student nurses' clinical skills in the practice setting. As a registered nurse the researcher

is bound by the Code of Professional Conduct (An Bord Altranais 2000), providing a measure of assuring ethical integrity. To reduce patient involvement, the skills selected for observation by the researcher did not require the curtains to be pulled around the patient's bed and included hand washing, blood pressure recording and routine urinalysis. The other three skills (IM injection, mouth care and administration of a nebuliser) were still performed by the student during their clinical placement and these also were included in the data generated by the practice based learning aid. Verbal consent was obtained from all patients who participated in the study and explanations were provided as to the nature and purpose of the research (Appendix 12). The principles of maintaining confidentiality and respect and dignity in all dealings with patients and staff were adhered to throughout the study. Any intrusion was kept to an absolute minimum, in particular when the curtains were pulled or when doctors were present.

Each structured observation record was allocated a code number. The name of the student nurse participant and corresponding code number were kept in a secure location, separate from the observation records. All data entered onto computer was password protected and stored in accordance with the Data Protection (Amendment) Act (2003). The use of code numbers to refer to individual participants has been employed in this report to protect their identity. Careful attention has also been given to ensure that all other information cited in the report, such as the biographical data, does not identify the participants involved in the study. Participants' names, addresses and consent forms will be destroyed once the study has been completed. Ethical approval for the study was gained from the Institute Research Ethics Committee (Appendix 14).

The nature of the research made it difficult to achieve complete anonymity as the researcher was conducting both field observations and facilitating the focus group. However, confidentiality was assured, restricting access to the raw data to the researcher alone (Ferguson et al, 2004). Students were informed how data was to be stored and ultimately destroyed, and reassurance was provided that anonymity and confidentiality would be maintained both throughout the study and in any dissemination of findings. All student participants and responses were coded so that direct quotations, responses to the questionnaire and data from the

practice based learning aid would not compromise the students' anonymity. The students were provided with the consent form (Appendix 3) and asked to sign it if they wished to participate in the study and place it in a secure box as they left the room. Student participants were also assured that they were free to withdraw from the study at any time. Students who did not wish to participate in the study were asked to put their unsigned consent form in the same box, so as to maintain anonymity. The rationale for taking these steps was to assure the participants' anonymity and also to encourage an honest response when completing the self-assessment data forms and written reflection components of the RCCSC (Parahoo, 2006).

3.10 Mixed-Methods Analysis Framework

The analysis framework used in this study has four phases and was based on Onwuegbuzie and Teddlie's (2003) framework for data analysis in mixed-methods research. Appendix 15 provides an overview of the stages of the mixed-methods data analysis process used in this study. The first stage is the use of methods to reduce the data, to transform it into a more ordered and simplified form. This required statistical analysis of the quantitative data using descriptive statistics and significance testing (3.11) and coding of the qualitative data using Miles and Huberman's (1994) framework (3.12). The second stage requires the data to be displayed using combinations of charts, graphs, tables, etc that make it more informative and easier for the reader to understand. These can be viewed in Chapters 4 and 5, presenting the findings from both data sets. Data is then compared as a form of triangulation adding to the robustness and credibility of the study. The final stage is further synthesis and integration of all the information into a coherent whole. In this stage the researcher is making the most plausible explanation for the underlying data, drawing conclusions and, in this research, providing a tentative theory (Chapters 6 and 7). The following sections provide details of the initial analysis stages for both data sets and the discussion chapter represents the integration stage of this study, providing a deeper and fuller understanding of the influence of the practice based learning aid on students' learning and the learning processes involved when developing and transferring clinical knowledge and skills into practice.

3.11 Quantitative Data Analysis

The stages of quantitative data generation in this study were highlighted in Table 1 and included stage 1 baseline data from the OSCE, stage 2 data from clinical placement (including practice based learning aid data, competency level data recorded by the researcher and competency level data recorded by the student for the same observed performance). Stage 3 included the data generated from the evaluative questionnaire. Each of the data collection instruments was given its own abbreviated code name and the initial for each of the clinical skills was used to identify it from the other instruments; for example the code for the OSCE hand washing was OHW. The data collection instruments had a checklist component that listed the 'steps' required for completing the skill and a component to record the competency level for each clinical skill, as described in section 3.6. The competency level awarded was based on the level descriptors provided for each level (Appendix 5) and included competency levels ranging from 'not competent' through 'partially competent' and 'competent' to 'fully competent' for each of the six skills. For analysis purposes each competency level was allocated a numerical value ranging from 1-4, thus generating a numerical score for the student's competence level for each skill.

As an example, the first competence assessment for the skill of hand washing completed by the student while on placement was coded HW1C, the second HW2C and so on. The Max competency level for each skill was subsequently calculated and coded using the same abbreviation with the word max added, so 'HWMaxC score' relates to the Max competence level achieved for the skill of hand washing. The researcher's observation competency level and the student's observed competency level were also coded in a similar way by putting the letter 'R' and 'S' respectively before the abbreviated skill. Therefore the code for the researcher's observed level for hand washing was 'RHWC'. The coding process permitted the conversion of nominal data into numerical values. Each student participant was allocated a unique code number so that their competence scores at various stages could be directly compared.

In order to consider the totality of a student's skill level, a combined competency level was calculated by totalling the competency levels for each of the skills. All Not Component (NC) scores were numbered '1', Partially Competent (PC) scores numbered '2', Competent (C) scores numbered '3' and Fully Competent (FC) scores numbered '4'. This allowed an overview of the total number of NC scores across the range of the six skills as well as the PC, the C and the FC scores. The argument presented is that currently, in the module system and indeed the entire programme, students' grades are based on a combined score or grade from numerous examination methods and subject matter. As with a conventional exam, where a number of components would be assessed to arrive at a total mark, this combined score would provide a single mark that reflects the student's overall competency level. The result considers the totality of the competence level in the clinical skills assessed during the OSCE and could then be directly compared with the pre-test (first combined competency levels recorded in clinical placement) and the post-test combined competency levels. It could be argued that the skills are not equal and that an FC performance in hand washing, for example, would not equate to a FC performance in a skill considered more technical, such as blood pressure recording (Ballie and Curzio, 2009). The premise in this study, however, is that the level descriptors provide a form of objectivity in determining the competency level obtained, regardless of the technical difficulty of the individual skill.

The questionnaire produced both nominal and ordinal data which was coded numerically however the student codes were not the same as the identifier codes used in the skills sheets in order to maintain anonymity when the questionnaire was distributed. Descriptive statistics were then used to describe the data in the form of frequencies and valid percentages.

Due to the available sampling technique and the sample size used in this mixed-methods educational research, it was not possible to make statistical inference based on confidence intervals, which are used to estimate the population parameters. Significance testing was used, however, to assess the evidence provided by the data. Desirable power is accepted to be >0.80, whilst typical power is ~0.60 (Cohen, 1969; 1988; Earl and Katz, 2006). A *post hoc* power

analysis using G*Power3 was carried out to determine the power of any statistical significant findings (Faul et al, 2007). As no *a priori* research studies have been carried out in this specific area of research, no previous guidelines were available as to what constitutes an appropriate sample size. A common convention is to try to collect at least enough data to have 80% power (Cohen, 1988), and power of 0.80 has become the conventional standard, although this is arbitrary (Suresh and Chandrashekara, 2012; Faul et al, 2007). A level of 0.05 (5%) was considered an appropriate value (Gravetter and Wallnau, 2000) and statistical power was set 0.69, which was based on the context of this research (an educational setting) using intact groups or an available sampling frame.

All the data was then statistically analysed using the Statistical Product and Service Solutions computer pack (SPSS, version 19) (Pallant, 2007). Crosstabulation was used on the categorical data to examine for relationships between the variables. To test for significance in the compared competency levels from the OSCE, the practice based learning aid, and the competency levels recorded for the observed skills performance from clinical placement, the Wilcoxon sign-rank test was used. Due to the skewed distribution of the data in the study this non-parametric test was used as a non-parametric alternative to the paired sample t-test (Ikewelugo and Godday, 2012; Maltby et al, 2007). The Wilcoxon sign-rank test allowed for the comparison of scores of the same continuous type variables on two occasions (Brace, Kemp and Snelgar, 2003; Siegel, 1956). In the case of this study the competence levels recorded at OSCE (Baseline), the first competency levels recorded using the practice based learning aid (Pre-test) and the maximum competency levels along with the observed competency levels (Post-test), were compared to determine if there was any statistical significance between them. The Wilcoxon signed-rank test was also used to explore significant differences between the students' responses to the specific questions in the evaluative questionnaire on the perceived competence levels before and after using the practice based learning aid implemented in the study. The level of statistical significance was defined as $p < 0.05$.

3.12 Qualitative Data Analysis

In this study the content analysis of the qualitative data was guided by Miles and Huberman's (1994) three-stage analysis process, a frequent strategy cited for qualitative analysis (Watson et al, 2008). The stages begin with data reduction followed by data display and conclusion drawing (Miles and Huberman, 1994) and link well with Onwuegbuzie and Teddlie's (2003) framework. Adopting Miles and Huberman's (1994) inductive approach allows for the raw text data from both the written reflections and the focus group transcript to be condensed into a brief summary format. This required detailed reading, re-reading and coding. The process allows for the establishment of links between the research findings and the raw data, and provided a means to ensure transparency and justification of the findings. Finally a tentative model about the underlying structure of experiences and processes evident from the data can be drawn. Careful consideration was given to the research question in order to explore the students' experiences of being involved in the educational approach including the use of the practice based learning aid and its influence on their clinical skills competency, in addition to exploring the factors that help to develop and maintain competence in clinical skills among undergraduate nursing students.

3.12.1 Analysis of focus group transcript

The qualitative strand of an explanatory-sequential design requires the analysis and interpretation of the data to provide a deeper understanding and explanation of the initial quantitative results (Creswell and Plano Clark, 2011). The focus group discussion was digitally recorded and the data was transcribed *verbatim*. The first stage of Miles and Huberman's (1994) process required the transcript of focus group transcript to be read and re-read in order to become immersed, obtain a sense of what the student was actually saying (Denzin and Lincoln, 2011), and identify the key issues (Miles and Huberman, 1984). The Microsoft Word insert comment function was used and comments were made in the margin in an attempt to interpret the meaning of students comments (Appendix 13). These inserted comments acted as marginal remarks for the researcher that could then be considered and reconsidered as new ideas and thinking developed towards formulating codes and categories (Miles and Huberman, 1984).

A process of open coding was then applied involving breaking down, examining, comparing, conceptualising and categorising the data (Strauss and Corbin, 2007). Each code is a summarising phrase which tries to express the meaning of a fragment of the student's text (Charmaz, 2006). This familiarisation allowed the researcher to develop a 'theoretical sensitivity' in the coding, referred to as being able to understand the key point in a selection of text and grasp what it is all about (Boeije, 2010). During the open coding process it was important to consider a number of questions about the data, such as: What is going on here? What is this about? What is this person trying to say? What does this term mean? (Boeije, 2010). This allowed the researcher to become more familiar with the data and to develop a better understanding of what it was actually saying. Some of the codes are directly derived from the terminology used by the students, known as *in vivo* codes (Strauss and Corbin, 2007) and others are those derived from the literature, known as 'theoretical concepts' or 'constructed codes' (Flick, 2011).
The first draft of open coding was then re-examined to make sure that there was no overlap. If there were some fragments of text that were assigned to a single code consideration was given as to whether it could be merged with another code. Similarly, if a single code was assigned to a large number of text fragments it was considered if these could be divided into two or more categories. Conferring with a work colleague experienced in coding helped to ensure that there was inter-rater reliability in the coding and that the point was reached where no new codes were needed to label text fragments (Robson, 2011; Denzin and Lincoln, 2011).

Once the first stage of open coding was complete, patterns or themes began to emerge, leading to the second stage of axial coding. This is the process whereby, following open coding, the data is reconstructed by making connections between the categories (Strauss and Corbin, 2007). During this process written memos were kept to serve as a reminder about what was meant by the terms being used and the thought process on the connections between the various codes and categories as they emerged. It was crucial to relate the categories to sub-categories, and specify the properties and dimensions of each category in order to provide coherence to the emerging analysis as the data was being reassembled (Denzin and Lincoln, 2011; Charmaz, 2006). The conceptual

analysis of each of the categories is presented in table format (Appendix 16) identifying the categories, sub-categories, codes and raw data sources that resulted from the open and axial coding processes. Columns are provided with numbered quotations from the focus group (FG) transcript and from the reflective comments (RC).

The second stage in Miles and Huberman's (1984) process requires the data to be displayed in a format that enables a fuller thematic description to emerge. Tables and charts were therefore designed to provide a clearer view of how the codes and categories are linked. The emerging categories and themes from both the focus group analysis and the analysis of the written reflective comments were presented to the members of the expert panel, as described in section 3.6.1, for discussion, comment and some form of consensus. Generally the context of the themes was accepted but after discussion and further review by the researcher some of the theme titles were changed and the agreed themes are presented in Chapter 5. All the findings from the study were presented to the research participants as part of the dissemination strategy (Section 6.6). This included the themes and categories identified from the qualitative analysis of both the focus group data and the data from the written reflective comments. This measure provided a means of member checking to add to the credibility of the findings (Lincoln and Guba, 1985). Agreement may be provided in order to please the researcher (Morse, 1994) or possibly due to a participant's difficulty in grasping the abstract synthesis presented (Sandelowski, 1993). In an attempt to overcome these difficulties the students were afforded the opportunity to offer comment at the end of the presentation and, whilst some clarity was required, there was a general acceptance of the key themes presented for both the focus group data analysis and the analysis of the reflective comments.

3.12.2 Analysis of reflective comments

The aim of this phase of the study was to answer the research question in relation to objectives 3 and 4 which set out to explore the influence of the practice based learning aid on student participants' competency in clinical skills and learning and to explore and describe first year undergraduate student nurses' perceptions of

the influence the practice based learning aid on clinical skills competency transition from novice towards competent practitioner.

A key factor in the analysis was to ensure that the text had meaning related to the context in which it was created, in that the role of the analyst is to construct a world where the text makes sense (Miles and Huberman, 1994). In order to prevent confusion with the student identification codes used for the focus group, each practice based learning aid booklet was numbered in advance. The prefix 'RS' for 'Reflection Student' was used and ranged from RS 1 for student number 1, up to RS 27. Each of the skills was also coded separately in order to differentiate between them, i.e., hand washing = HW, blood pressure recording = BP, urinalysis = UR, intra-muscular injection = IM, mouth care = MC and administration of a nebuliser = Neb. Each skill was also allocated a number between 1 and 4, to identify whether it was the first, second, third or fourth assessment of that skill.

Each quote or comment was then transcribed *verbatim*, using the codes as identified and numbered in sequence (Appendix 17). Of the twenty seven voluntary participants, eight students did not return their completed booklets. Due to assurances provided regarding the anonymity of the data collection process, information as to why these were not submitted is not known. The qualitative analysis is therefore based on data provided by the remaining nineteen students.

Similarly to the process described for the analysis of the focus group data, the transcript of the written reflective comments was read and re-read as a means of becoming immersed in the data and identifying the key issues (Miles and Huberman, 1994). The Microsoft Word insert comment function was again used in a similar fashion as described for the focus group analysis, and comments were made in the margin in an attempt to interpret the meaning of the written reflections (Appendix 17). The inserted comments acted as marginal remarks for the researcher for the purpose of formulating codes and categories (Miles and Huberman, 1994).

An abductive approach, as described by Morgan (2007), was adopted to look for corroboration of the emerging tentative theory from the focus group analysis. The

open and axial coding process and the emerging categories described in the focus group analysis again provided the framework for the analysis of the reflective comments. Extrapolation is presented in table format (Appendix 16) identifying the categories, sub-categories, codes and raw data source that resulted from the open and axial coding process of the written reflective comments. Adhering to Miles and Huberman's (1994) process for analysis, the data was displayed in the findings chapter in the form of tables and charts to provide fuller picture of the thematic description of how the codes and categories are linked. Credibility measures included the use of the expert panel and member checking, as described in the previous section.

The final stage of data integration was carried out after all the data from both the qualitative and quantitative strands of the study were completed. This is presented in the discussion and conclusion chapters, where further analysis and theorising resulted in the formation of a tentative model for competency development explaining the relationships in the data.

Conclusion

This chapter has presented the methodological considerations that underpinned the current study and outlined the supporting philosophical basis of the study, the design and the methods used to carry out the research. The argument was made that using mixed methods, underpinned by pragmatism, was the most appropriate approach to ensure that the research aim and the objectives of this study were met and the research question answered. The resultant research methodology provides for a systematic and rigorous approach to measuring the effectiveness of using RCCSC as a learning aid for the transfer of clinical skills to the practice setting of nursing and provides for a deeper understanding of the learning processes and experiences of undergraduate student nurses when developing and maintain competence in a professional practice.

Chapter 4: Findings from the Quantitative Strand of the Study

Introduction

The research question asked, 'Does a practice based learning aid influence theory practice integration for clinical skills competence among undergraduate nursing students'? This mixed-methods study of undergraduate nursing students therefore explored how an educational approach integrating simulated learning with a practice based learning aid influenced their clinical skills competency transition in the practice setting. The approach, including the learning aid (RCCSC), was designed specifically for the study. The learning aid synthesises a clinical skills checklist with a competency performance grading scale and the process of reflection. Quantitative measurements of first year general nursing students' clinical skills competency were recorded using the grading scale developed for the study (3.6), along with evaluative qualitative data from the written reflective comments and the focus group. These measurements were made at a number of stages during the transition from first year to second year.

This chapter presents the first two mixed-methods analysis stages of data reduction and data display for the quantitative data. Key charts and tables have been selected to present the statistical test data from the main findings of the study and reference is made to additional material available in the appendices. Any identified relationships between the different data sets and any statistical significance are also reported. Data includes the student nurses' biographical information; competency grading scale findings from the OSCE which provide a baseline measurement for the students' clinical skills competence after simulation-based training; the competency scales from the practice based learning aid (RCCSC); and competency scales recorded by the researcher in clinical placement. The results from the questionnaire (Appendix 7) evaluating the students' perception of the practice based learning aid are also reported in this chapter.

4.1 Biographical Details of the Sample

From a total cohort of 45 first year undergraduate general nursing students at one third level college in Ireland, 32 volunteered to participate in the study. Of these, five were randomly selected to participate in piloting the data collection instruments and were consequently not included in the main study. Table 2 provides further details of the remaining 27 student participants in the study.

Age Group	Frequency	Percent
Standard Student	17	62.9
Mature Student	8	29.6
Not Completed	2	7.4
Total	27	100.0

Table 2: Age group of participants

Table 2 shows that of the 27 students 26 completed the questionnaire (Appendix 7) of which 17 were standard admission students below the age of 23 years and 8 were mature students above 23 years (An Bord Altranais, 2005). One student did not answer the question and one student who consented to participate in the study did not complete the questionnaire. Due to the confidential nature of the questionnaire and the assurances provided regarding anonymity it is not known why one student decided not to complete the questionnaire.

4.2 Clinical Competency Scores

This section presents the quantitative findings from Stage 1, the OSCE, and Stage 2 clinical placement (Table 1), which explored the level of clinical skills acquisition, the level of clinical skills competency attained and the level of clinical skills retention among undergraduate student nurses following the theoretical and simulation-based aspects of the educational approach used in the study. These findings also help to answer the research question by providing an indication of how the education approach integrating the practice based learning aid

influenced the clinical skills competency levels of the undergraduate student nurses during clinical practice.

4.2.1 Baseline competency levels recorded at the OSCE

This section presents the findings of the baseline competency levels recorded for each student at the OSCE in the first data collection stage of the research and helps to meet objective 2 of the study. All first year students (n=45) were required to take the OSCE and of the 32 students who had volunteered to participate in the study, five volunteered for the pilot study (3.7) and were excluded from the main study. The selection of the six pre-identified clinical skills is explained in section 3.6; these comprise of;

1. Hand washing
2. Blood pressure recording
3. Urinalysis
4. Intramuscular injection
5. Administration of a nebuliser
6. Mouth care

The six skills were assessed in the OSCE and incorporated into the practice based learning aid. For each of the six clinical skills the structured observation record described in section 3.6 was used to determine the level of competency achieved in the OSCE. It contained a checklist component, listing the criteria required for completing the skill and a competency grading scale ranging from ‘Not Competent’, ‘Partially Competent’, ‘Competent’ to ‘Fully Competent’. The level awarded is based on the level descriptors provided for each (Appendix 5). All the data generated was coded and a database created in SPSS for statistical analysis. Chapter 3 above provides details of the data collection instruments, procedure and analysis. A combined competency level for the OSCE was calculated to provide an overall measurement of the student’s clinical skill competency level (see section 3.11). This result considers the totality of the competency level in the clinical skills assessed during the OSCE. Table 3 and Figure 3 provide a visual presentation of the frequency distribution of the combined competence level for the clinical skills assessed in the OSCE.

Competence Level	Frequency	Percent
Not Competent	17	10.5
Partially Competent	24	14.8
Competent	57	36.2
Fully Competent	64	39.5
Total	**162**	**100.0**

Table 3: Frequency of the combined baseline OSCE competency levels

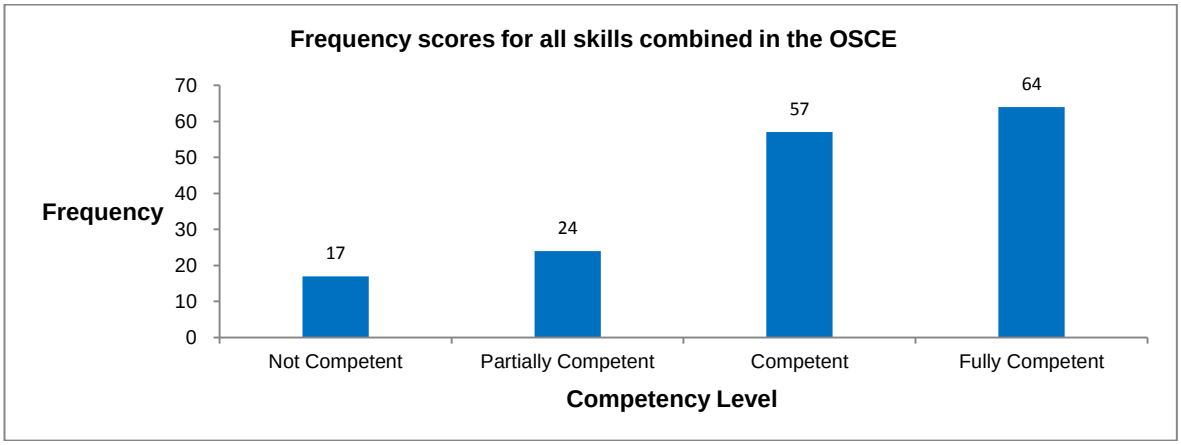

Figure 3: Frequency of the combined baseline OSCE competency level for all skills

A total of 162 competency scores were recorded representing 27 students completing 6 skills each (27 x 6 = 162) (Table 3). From this total 17 were not competent, 24 were partially competent, 57 were competent and 64 were fully competent (Table 3 and Figure 3). Separate figures for each of the six skills showing the range of competency levels achieved at the OSCE can be viewed in Appendix 18 Figures 1 to 6.

For the skill of hand washing (Appendix 18, Figure 1) one student gained a 'Not Competent' level in the OSCE. All other students passed, with four gaining a 'Partially Competent' level, five gaining a 'Competent' level and 17 gaining a 'Fully Competent' level.

Four students gained a 'Not Competent' level in the OSCE for the skill of blood pressure recording (Appendix 18, Figure 2). All the other students passed, with

two scoring ‘Partially Competent’, 12 scoring ‘Competent’ and nine gaining a ‘Fully Competent’ level.

For the skill of urinalysis (Appendix 18, Figure 3), one student failed, with a ‘Not Competent’ level. The other students passed, with three scoring ‘Partially Competent’, 11 scoring ‘Competent’ and 12 gaining a ‘Fully Competent’ level.

Four students gained a ‘Not Competent’ score in the OSCE for the skill of intramuscular injection (Appendix 18, Figure 4). All other students passed, with seven scoring ‘Partially Competent’, nine scoring ‘Competent’ and seven gaining a ‘Fully Competent’ score.

For the skill of administering a nebuliser (Appendix 18, Figure 5), seven students failed, with a ‘Not Competent’ level. The other students gained a pass grade, with two scoring ‘Partially Competent’, eight scoring ‘Competent’ and ten gaining a ‘Fully Competent’ level.

None of the students failed the skill of mouth care (Appendix 18, Figure 6). There were six students who gained a ‘Partially Competent’ level, 12 scoring ‘Competent’ and nine gaining a ‘Fully Competent’ level. Table 4 provides a summary of the competency levels for each of the six skills in the OSCE.

	OSCE Scores n (%)				Total
	Not competent	Partially competent	Competent	Fully competent	N (%) 100%
Hand washing	1 (3.7)	4 (14.8)	5 (18.5)	17 (63)	27
Blood pressure	4 (14.8)	2 (7.4)	12 (44.4)	9 (33.3)	27
Urinalysis	1 (3.7)	3 (11.1)	11 (40.7)	12 (44.4)	27
IM injection	4 (14.8)	7 (25.9)	9 (33.3)	7 (25.9)	27
Nebuliser	7 (25.9)	2 (7.4)	8 (29.6)	10 (37)	27
Mouth care	0 (0)	6 (22.2)	12 (44.4)	9 (33.3)	27
Total	**17 (10%)**	**24 (15%)**	**57 (35%)**	**64 (40%)**	**162 (100%)**

Table 4: Student participant competency levels from the OSCE

The numbers in brackets (%) (Table 4) are the valid percentage figures from a total of n=27 (100%) student participants. The shaded area highlights that for all of the skills, the majority of students were achieving a level of either ‘Competent’ (35%) or ‘Fully Competent’ (40%) at the OSCE. The remaining 25% were achieving a Not Competent or Partially Competent level. The competency levels in this section represent the baseline levels in the first stage of the study.

4.2.2 OSCE and first RCCSC scores

This section reports the findings related to examining the level of competent performance among undergraduate student nurses after a three-month interval away from clinical practice to help meet Objective 3 exploring the influence of the practice based learning aid on students’ competency in clinical skills and contribute to answering the research question. The competence scores from the students’ first self-assessment in the clinical area using the RCCSC (first RCCSC scores) are reported and then compared with the OSCE scores to determine whether or not the students’ competence in clinical skills had deteriorated during the summer vacation away from clinical practice. Only participants with data present from both the OSCE and the first assessment in clinical placement are included (n=22). Section 3.11 provides a detailed explanation as to why a number of the student participants were unable to complete all of the clinical skills assessments while on clinical placement. In this phase of the study all students had completed their OSCE in all six of the clinical skills (n=27). When on clinical placement students were to seek learning opportunities to perform each of the skills and complete up to four self-assessments on each skill using the practice based learning aid.

There were five student participants who did not return their practice based learning aid booklets at the end of the study and, due to assurances provided regarding anonymity and permission to withdraw from the study at any time, it is not known why these were not submitted. None of the remaining students had the opportunity to perform all of the skills in practice and subsequently the ‘n’ value differs for each of the skills.

Table 5 provides the frequency of the combined first competency levels recorded in the RCCSC

	Combined First RCCSC competency levels			
	Frequency	Percent	Valid Percent	Cumulative Percent
Not Competent	4	2.5	4.3	4.3
Partially	17	10.5	18.5	22.8
Competent	36	22.2	39.1	62.0
Competent	35	21.6	38.0	100.0
Fully Competent				
Total	**92**	**56.8**	**100**	**100.0**

Table 5: Frequency for combined competency levels in the first placement

Table 5 show that data from the RCCSC used in clinical placement found that there were 92 first self-recorded competency scores. These were provided by 22 of the original 27 students who completed the first placement scores. Due to assurances regarding anonymity it was not possible to follow up on why 5 students did not complete the RCCSC. Figure 4 provides a bar chart to visualise the distribution of competency levels achieved.

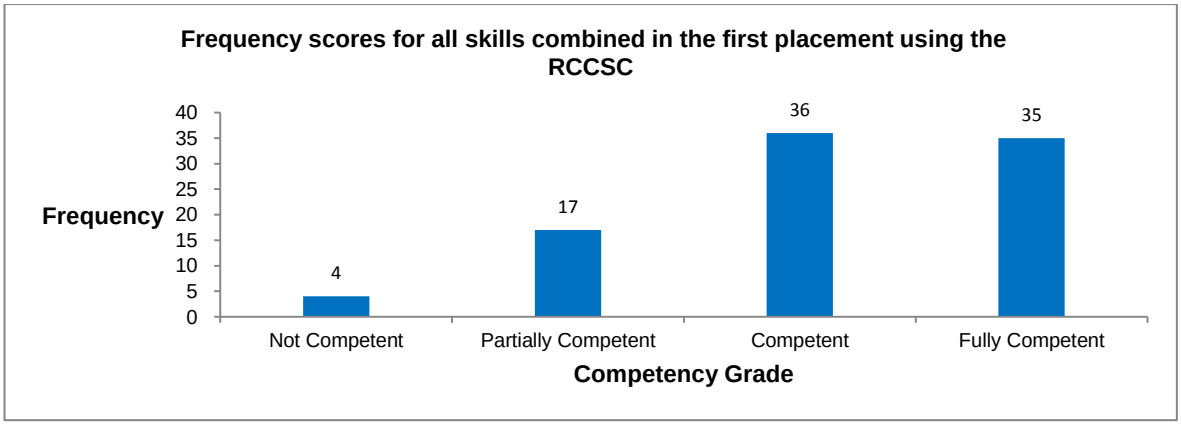

Figure 4: Frequency of the combined competency levels for the first placement using the RCCSC.

The competency levels in Figure 4 provided are from a combination of skills completed in clinical placement, collated to provide an overall competency level. From a total of 92, there were four Not Competent scores, 17 Partially Competent scores, 36 Competent Scores and 35 Fully Competent Scores.

The combined first RCCSC competency levels were then directly compared with the combined competency levels from the OSCE to determine if there was any significant difference between the two data sets. Only the scores from those students who completed both the OSCE and the RCCSC were used. The cross-tabulated findings are presented in Table 6 and Figure 5 below.

		Combined First RCCSC competency level				
Combined OSCE competency level		NC	PC	C	FC	Total
	NC	1	2	2	4	9
	PC	0	1	6	4	11
	C	0	10	16	9	35
	FC	3	4	12	18	37
Total		4	17	36	35	n=92

Table 6: Comparison of OSCE and first RCCSC competency levels

Table 6 shows that there were a total of 92 recorded competency levels from student participants who completed the OSCE and also completed the first skills assessment in clinical placement using the clinical skills component of the practice based learning aid (first RCCSC scores). The shaded diagonal in the table indicates where competency levels recorded at both stages were the same. Scores above the diagonal indicate where there was an improvement in the competency level. Scores below indicate a decline in the competency level. This principle applies to all similar tables. In Table 6, the shaded diagonal shows that there were a total of 36 (1+1+16+18=36) competency levels that remained the same at both the OSCE and at the first assessment using the practice based learning aid recorded in clinical placement. The numbers above the shaded diagonal show that when comparing competency levels between the OSCE and the first assessment in clinical placement, 27 competency levels improved (2+2+6+4+4+9= 27). The numbers below the shaded diagonal show that 29 (3+10+4+12 =29) competency levels declined between the OSCE and the first competency level recorded in clinical placement.

Figure 5 provides a bar chart comparing the frequency of the combined competency levels from the OSCE with the first competency levels recorded in the practice based learning aid.

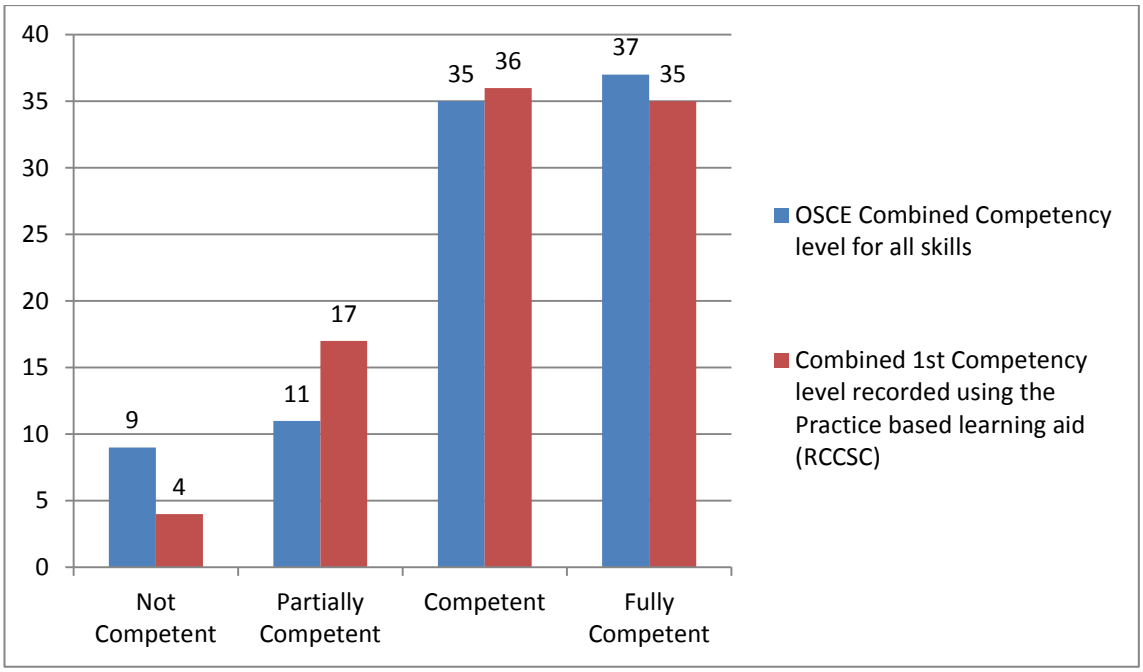

Figure 5: Comparison between the OSCE and the first RCCSC assessment: combined competence scores for all skills

Figure 5 above provides the combined competency levels for all skills recorded at both the OSCE and the first recording from clinical placement using the practice based learning aid. The minimal difference between the competency levels of the two data sets is plainly visible (Figure 5).

A Wilcoxon signed-rank test indicated that there was a no statistically significant difference between the combined OSCE competency levels and the first RCCSC competency levels (z=-0.179; *p=0.858*). The power value was calculated at 96% (p≤0.05) which indicates that there is a 96% probability that if there was any significant difference it would have been found.

A break-down of the findings for each of the separate skills is provided in Appendix 19 Tables 1-6. For the skill of hand washing five students recorded an improvement in their competency levels between the OSCE and the first recording using the RCCSC in clinical placement. Seven recorded a decline and ten remained at the same level of competence during this period (Appendix 19, Table 1). Not all students were able to perform all of the skills in clinical placement, so the 'n' value varies for each skill (see section 3.12). For blood pressure recording, nineteen students completed both the OSCE and the clinical

skills component of the RCCSC while on clinical placement. Of these, three recorded an improvement in their competency level between the OSCE and the first recording from clinical placement using the RCCSC. Six students recorded the same competency level and eight students recorded a decline (Appendix 19, Table 2).

Only four of the twenty seven students who completed the OSCE were able to complete the clinical skills component of the RCCSC while on clinical placement for the skill of Mouth Care (Appendix 19 Table 3). None of the four recorded an improved competency level between the OSCE and the first RCCSC; two recorded a decline and two remained the same.

For the skill of IM injection seventeen of the twenty seven students who completed the OSCE were able to complete the clinical skills component of the RCCSC while on clinical placement (Appendix 19 Table 4). Nine students of these students recorded an improved competency levels between the OSCE and the first RCCSC. Four students recorded a decline in their competency level and three recorded the same competency level during this period.

For the skill of urinalysis, twenty one students were able to complete the clinical skills component of the RCCSC while on clinical placement (Appendix 19 Table 5). Six of these students recorded an improved competency level between the OSCE and the first RCCSC, four recorded a decline and eleven remained the same.

Of the twenty seven students who completed the OSCE, ten were able to complete the clinical skills component of the RCCSC for administering a nebuliser while on clinical placement (Appendix 19, Table 6). Of these, two students recorded an improved competency level, four recorded a decline and four remained the same.

The findings demonstrate that 75.2% of competency levels in the OSCE were either competent or fully competent, compared with 77.1% of the first RCCSC competency levels and that no statistical significance was found between both

set of results. Closer examination of the individual skills found that for four of the six clinical skills (hand washing, blood pressure recording, mouth care and administering a nebuliser) most of students' competency levels either remained the same or showed a decline between the OSCE and their first assessment in clinical placement using the RCCSC. A different pattern emerges for the skills of intramuscular injection and urinalysis, where most students either remained the same or showed an improvement in their competency levels. These findings are discussed in section 6.2.

4.2.3 OSCE and clinical placement scores using the RCCSC

This section reports on the findings collected during the clinical placement in stage 2 of the research and compares these competency levels recorded in the RCCSC with the baseline competency levels recorded in the OSCE helping to meet objective 3 of the study.

The Max Score variable was calculated by identifying the highest competency level achieved for each student in each of the skills they had the opportunity to perform in practice (see section 3.11). The Max score reflects the student's competence level achieved in clinical placement. Table 7 shows the frequency distribution of the Max Competency levels achieved for all skills using the practice based learning aid.

Combined Max RCCSC Scores		
	Frequency	Percent
Not Competent	2	2.2
Partially Competent	6	6.5
Competent	19	20.4
Fully Competent	66	71.0
Total	93	100

Table 7: Frequency of the combined Max RCCSC competence levels

There were a total of ninety three Max Competency levels identified for all the skills completed by the twenty two students who submitted the RCCSC from clinical placement (Table 7). Figure 6 provides a bar chart to help visualise the

distribution of the Max competency scores recorded in the practice based learning aid.

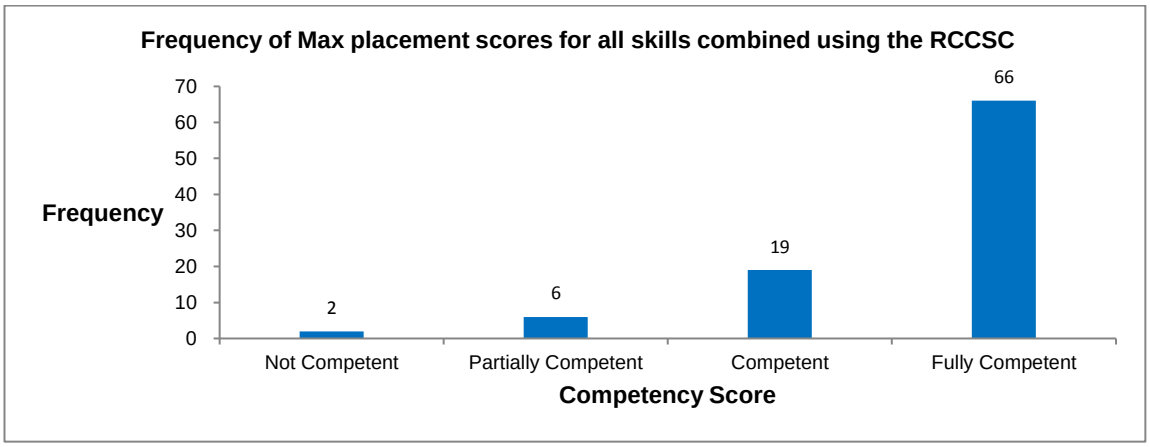

Figure 6: The frequency of the combined Max RCCSC competency levels

Figure 6 shows that of the ninety three Max competence levels, two were not competent, six were partially competent, nineteen were competent, and sixty six were fully competent.

The combined Max RCCSC competency levels were directly compared with the combined competency levels from the OSCE to determine if there was any significant difference between the two data sets. Only the scores from those students who completed both the OSCE and the RCCSC were included. The cross-tabulated findings are presented in Table 8 and Figure 7 below.

		Combined Max RCCSC Score				
		NC	PC	C	FC	Total
Combined OSCE Score	NC	0	1	3	6	10
	PC	0	1	1	9	11
	C	0	4	9	22	35
	FC	2	0	6	29	37
Total		2	6	19	66	93

Table 8: Combined OSCE levels compared with Max RCCSC competency levels.

When comparing competency levels between the OSCE and the Max competency levels in clinical placement, forty two recorded competency levels above the shaded diagonal indicate an improvement, twelve competency levels below the shaded diagonal show a decline and thirty nine in the shaded diagonal remained the same. These competency levels only relate to the 22 students who

provided both a max competency level and competency level for the OSCE. Figure 7 provides a bar chart comparing the combined competency levels for all the skills from the OSCE and the Max RCCSC competency levels recorded in the practice based learning aid during clinical placement.

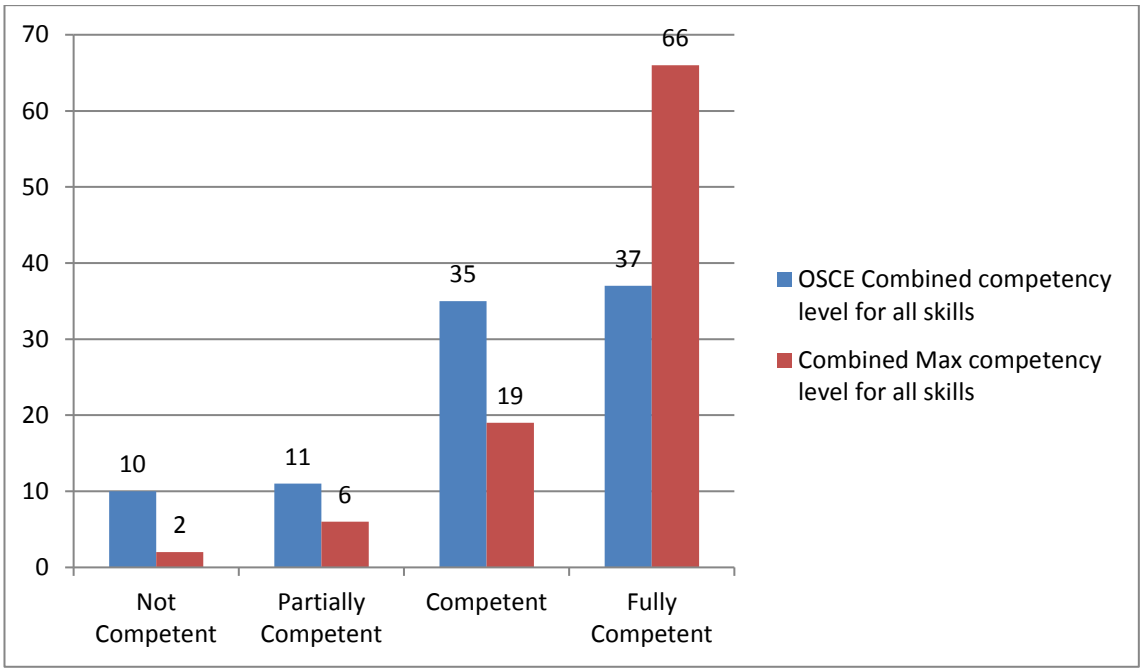

Figure 7: The combined competence scores for all skills in the OSCE compared with the combined Max RCCSC competence scores

Figure 7 demonstrates the differences between the two data sets, notably the increased difference between the number of the Max RCCSC Fully Competent levels (66) and the number of OSCE Fully Competent levels (37). A Wilcoxon signed-rank test indicated that the Max clinical placement competency levels using the RCCSC were statistically significantly higher than the combined OSCE competency levels (z= -4.152, *p<0.001*).

A further comparison was made between the combined Max RCCSC competency levels and the combined first RCCSC competency levels, both recorded during clinical placement using the practice based learning aid, to determine if there was a pattern of improvement or decline between the two data sets and if there was statistical significance for any difference detected (Table 9).

		Max Competency level using the RCCSC

First Competency level using the RCCSC		NC	PC	C	FC	Total
	NC	2	0	2	0	4
	PC	0	6	4	7	17
	C	0	0	13	23	36
	FC	0	0	0	35	35
Total		2	6	19	65	92

Table 9: First RCCSC competency levels compared with the Max competency levels

Table 9 shows that there were a total of 92 recorded competency levels from student participants who both completed the first RCCSC and also recorded a Max competency levels in clinical placement. The numbers above the shaded diagonal show that thirty six competency levels recorded improved between the first RCCSC score recorded and the Max Score. None of the competency levels recorded showed a decline in this period and the shaded diagonal shows that fifty six competency levels remained the same.

Figure 8 provides a bar chart presentation of the comparison between the combined Max RCCSC competency levels and the combined first RCCSC competency levels.

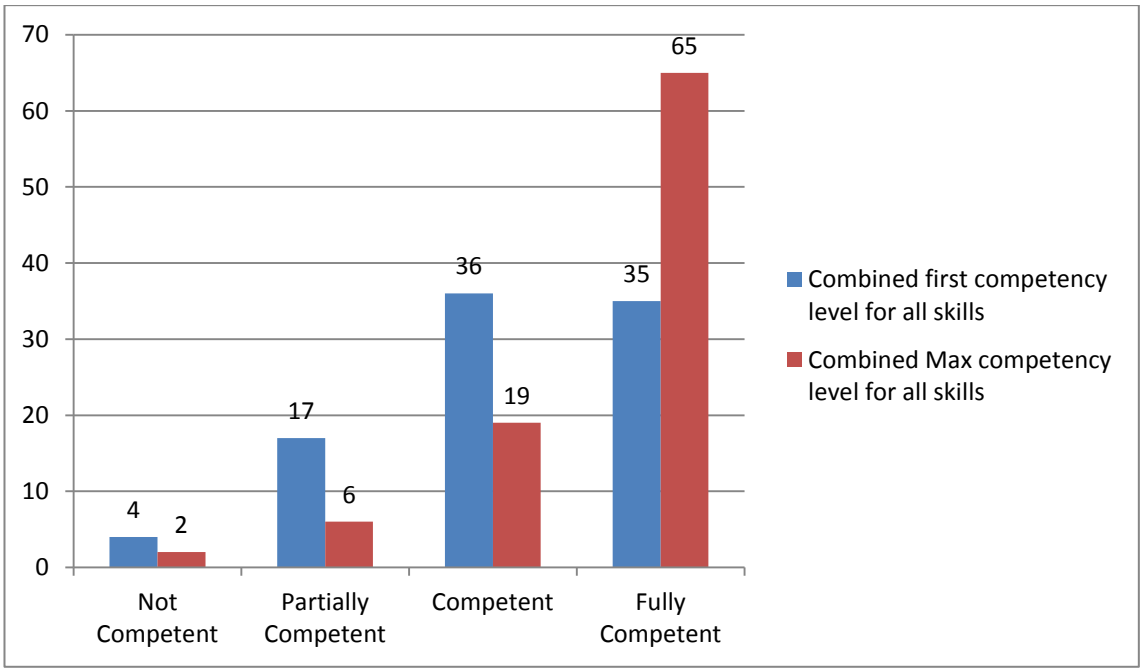

Figure 8: Combined first RCCSC competence scores for all skills compared with combined Max RCCSC competence scores

The difference in recorded competency levels between the two data sets can be seen in Figure 8. Most notably is the increased difference between the number of the Max RCCSC Fully Competent scores (65) and the number of first RCCSC Fully Competent scores (35). A Wilcoxon signed ranks test indicated that the Max RCCSC competency levels achieved by the students were statistically significantly better when compared with their first RCCSC competency levels (z=5.529, *p<0.001).*

A break-down of the competency levels for each of the six skills recorded at the OSCE, the first RCCSC and the Max RCCSC is provided in Appendix 20 Table 1. For each of the six clinical skills there was an increase in the number of students gaining a fully competent level between the OSCE and their Max competency level in clinical placement. Closer examination revealed that of the two students who gained a Not Competent level at the first RCCSC for blood pressure recording, one had also scored a Not Competent level at the OSCE. The competency level increased to Competent for the Max blood pressure recording competency level. The other student had a Fully Competent level at the OSCE but had decreased to a Not Competent level at the first RCCSC, and remained at this level for their Max competency level. The student who scored a Not Competent at the first RCCSC for the skill of urinalysis also stayed at this level for their Max competency level, which was a decline from the Fully Competent level gained at the OSCE. The student who had a Not Competent for the skill of IM injection at the first RCCSC had deteriorated from a Fully Competent at the OSCE but had returned to Fully Competent by the time they completed their Max competency level for this skill.

To determine if there was a pattern of progressive improvement in competency levels, the frequency that the Max competency level was also the final assessment score using the practice based learning aid was identified for each of the six clinical skills (See Table 10).

Clinical Skill	No of students who completed the RCCSC	Number of students who's Max competency level was the same as their final assessment using the practice based learning aid
Hand Washing	22	21
Blood Pressure Recording	19	19
Mouth Care	4	4
IM Injection	17	17
Urinalysis	21	19
Nebuliser	10	8

Table 10: Students whose highest competency level achieved in clinical placement (Max) was the same as their final competency level using the practice based learning aid (RCCSC).

The first column in Table 10 list each of the six skills in the practice based learning aid. The middle column indicates the number of students who documented their self-assessed competency level for that skill using the practice based learning aid. The last column shows the number of students whose highest competency level (Max) recorded in clinical practice was also the final competency level recorded using the practice based learning aid. It shows that for the skills of blood pressure recording, mouth care and IM injection the highest competency level achieved in clinical placement was also the final competency level recorded in clinical placement. This was generally the case for the other three skills, where 21 out of 22 students gained their Max score in their final assessment for the skill of hand washing, 19 students out of 21 gained their Max competency level in their final assessment for the skill of urinalysis and eight out of ten students gained their Max competency level in their final assessment for the skill of administering a nebuliser. Overall, 95% of the Max competency levels were also the final competency levels recorded in the practice based learning aid.

Tables comparing OSCE competency levels with Max Competency levels for each of the skills are provided in Appendix 20 Tables 2 to 7. For the skill of hand washing, thirteen students recorded identical competency levels for both the OSCE and the Max Competency level. Eight students recorded an improvement and one student recorded a decline. It is also noted that only one student gained

a ‘Not Competent’ in their OSCE and none of the students recorded a ‘Not Competent’ after using the practice based learning aid (RCCSC) in clinical placement (Appendix 20, Table 2). For the skill of blood pressure recording there were nineteen students who performed both the OSCE and used the RCCSC (Appendix 20, Table 3). Of these nineteen students, ten recorded the same competency level at both the OSCE and the Max competency level, eight recorded an improvement. One student who achieved a Fully Competent in the OSCE but this declined to a Not Competent level at the first RCCSC and remained at this level for the Max. Closer examination showed that for this student had only one self-assessment completed in clinical placement for this skill. The first RCCSC level recorded therefore also represents the Max RCCSC level achieved for this student. It is also noted that one of the students who achieved a Not Competent level in the OSCE for blood pressure recording also recorded a Not Competent in the RCCSC during clinical placement.

Only four students had the opportunity to perform the skill of Mouth care while on clinical placement (Appendix 20, Table 4). Of these four students one recorded a competent score at both stages, two declined from a competent at the OSCE to a Partially Competent in clinical placement and one recorded a Fully Competent in placement having previously achieved a competent in the OSCE.

For the skill of IM injection data, seventeen students recorded competency levels in clinical placement using the RCCSC (Appendix 20, Table 5). Eleven students recorded an improvement in their competency level, three recorded competency levels that had declined from the level achieved at the OSCE and two remained at the same competency level for both stages. It should be noted that for this skill, three students had achieved a ‘Not Competent’ level in the OSCE but none of the students recorded a Not Competent for the Max level using the RCCSC.

There were twenty one students who recorded competency levels in both the OSCE and in the RCCSC for the skill of Urinalysis (Appendix 20, Table 6). Nine of these students recorded the same competency level at both the OSCE and for the Max in clinical placement. Ten recorded an improvement when compared with the level achieved at the OSCE and two recorded a decline. One student

had achieved a ‘Not Competent’ level at the OSCE and improved to Fully Competent and another student who had a Fully Competent in the OSCE recorded a ‘Not Competent’ during clinical placement.

Finally, there were ten students who completed the skill of administering a nebuliser while in clinical placement (Appendix 20, Table 7). Four of these students recorded the same competency level at both the OSCE and for the Max competency level achieved in clinical practice. Another four recorded an improved level of competency and two recorded a decline. Of the two students who had achieved a Not Competent level at the OSCE one improved to a Fully Competent level and one to a Partially Competent level. None recorded a Not Competent level as the max score achieved in clinical placement.

The results in this section help to answer the research question and meet objectives 2 and 3 of the study exploring the level of transfer of competency to the practice setting and the influence of the practice based learning aid on their clinical skills competency. In summary the findings demonstrate a marked improvement in the number of fully competent levels recorded in clinical practice (71%) when compared to either the fully competent levels recorded in the OSCE (39.5%) or the fully competent scores recorded at the beginning of the clinical placement (38%). Moreover, the difference in competency levels between the data sets was statistically significant ($p \leq 0.05$). Closer examination reveals that for each of the six clinical skills there was a continued improvement in the number of fully competent levels between the OSCE, the first RCCSC and the Max RCCSC. Section 4.2.4 reports the results related to the competency levels recorded by the researcher and the student for the observed skills towards the end of clinical placement during stage 2 of the research.

4.2.4 Clinical skills competency levels recorded by the researcher during clinical placement

This section presents the findings from the clinical skills observed by the researcher towards the end of the clinical placement. For each of the observed skills, a competency level was awarded by the researcher and also by each student grading their own competency level using the same competency marking

sheets as those used in the OSCE. The aim was to provide data which would indicate the level of clinical skills competency attained by the students at the end of their clinical placement and then compare these findings with previously recorded competency levels. This further allowed for direct comparison between the competency levels awarded by the researcher and those by the students, to help determine the reliability of the practice based learning aid.

Details explaining the procedure involved in collecting the data are provided in section 3.8. A total of twenty two students were observed in practice performing a hand wash and either a blood pressure recording or urinalysis, depending on the opportunity available at the time the researcher visited the clinical placement. One student on the paediatric ward was only observed performing the skill of hand washing as there was no opportunity to perform any of the other skills included in the RCCSC at the allocated time. The limitations of the study are discussed in section 6.5.

The combined researcher's observed competency levels for the skills observed in clinical placement were compared with the combined OSCE competency levels for all skills (Table 11). Only the competency levels awarded to students who completed both the OSCE and who were observed in clinical practice are included in the calculations.

		Researcher's observed competency level for all skills				
		NC	PC	C	FC	Total
OSCE competency level for all skills	NC	0	0	1	2	3 (7%)
	PC	0	0	2	4	6 (14%)
	C	0	1	6	6	13 (30%)
	FC	0	2	3	16	21 (49%)
Total		0 (0%)	3 (7%)	12 (28%)	28 (65%)	43 (100%)

Table 11: OSCE combined competency levels compared with the researcher's combined competency levels observed in clinical placement

Table 11 shows that there were a total of forty three combined observed competency levels recorded from clinical placements. When comparing competency levels between the OSCE and the researcher's observed competency levels in clinical placement, fifteen competency levels awarded by the researcher were higher than the OSCE (above shaded diagonal), six were lower than OSCE (below shaded diagonal) and twenty two were the same as the OSCE (shaded diagonal).

Figure 9 provides a bar chart comparing the percentage frequency distribution between the researcher's and the OSCE competency levels for all skills.

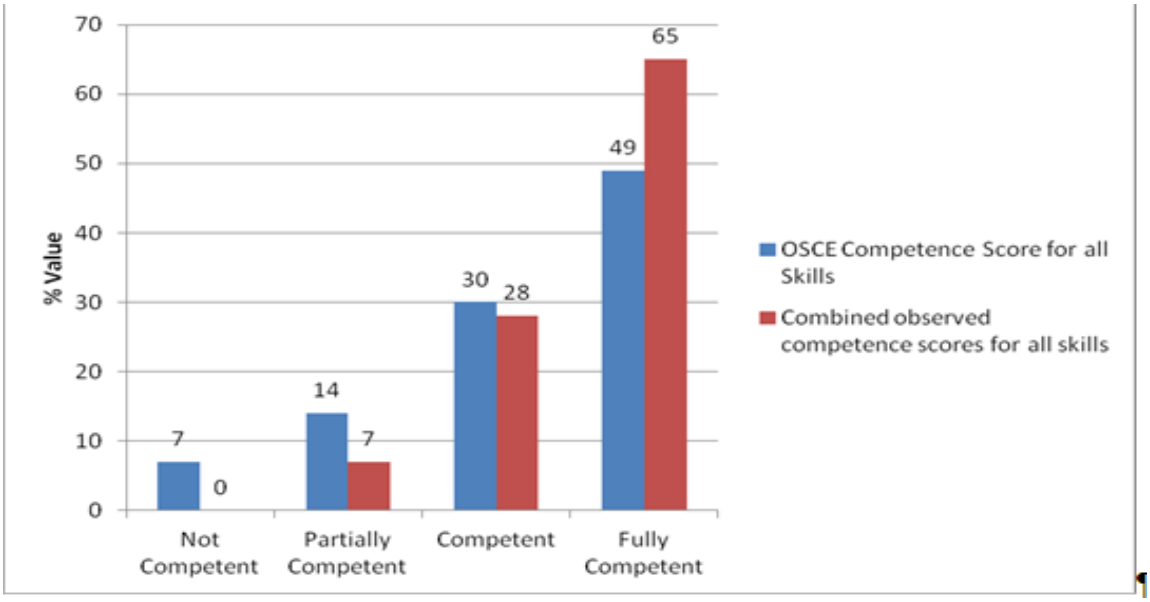

Figure 9: OSCE competence scores for all skills compared with the combined researcher's observed competence scores while on clinical placement

Figure 9 shows that none of the levels awarded by the researcher when observing the students after completing the RCCSC were in the 'Not Competent' range. Also visible is the increase in fully competent scores between each stage. There were 65% of the competency levels awarded by the researcher for the observed clinical skills in the 'Fully Competent' range compared with 49% of the competency levels recorded from the OSCE. A Wilcoxon signed-rank test indicated that the improvement between the clinical skills competency levels recorded at the OSCE when compared with the competency levels recorded by the researcher for the same skills observed during clinical placement was statistically significant (z=-2.052, *p= 0.040*).

When comparing the competency levels of students who were observed in practice and who also completed the first RCCSC assessment a total of 37 competency levels were recorded (Table 12).

		Researcher's Observed Competency levels for all Skills				
First RCCSC Combined competency levels		NC	PC	C	FC	Total
	NC	0	0	0	1	1 (3%)
	PC	0	0	4	1	5 (13.5%)
	C	0	1	5	9	15 (40.5%)
	FC	0	1	2	13	16 (43%)
Total		0 (0%)	2 (5.5%)	11 (30%)	24 (65%)	37 (100%)

Table 12: Researcher's combined competency levels observed in clinical placement compared with first RCCSC levels

The shaded diagonal in Table 12 shows that eighteen (5+13) of the competency levels recorded by the researcher for the observed clinical skills were the same level as that recorded as the first competency level in the practice based learning aid for the same skill. Fifteen of the competency levels recorded by the researcher were an improvement on the levels recorded as the first RCCSC self-assessment (above shaded diagonal) and four competency levels had

deteriorated (below shaded diagonal). A total of 65% of the researchers recorded competency levels were in the 'Fully Competent' range compared with 43% of the first RCCSC recorded competency levels. A Wilcoxon signed-rank test found that the difference between the competency levels recorded by the researcher and the combined first RCCSC levels was statistically significant (z= -2.254, *p=0.024*). Figure 10 provides a bar chart comparing the combined observed competency levels recorded by the researcher and the recorded first RCCSC combined competency levels.

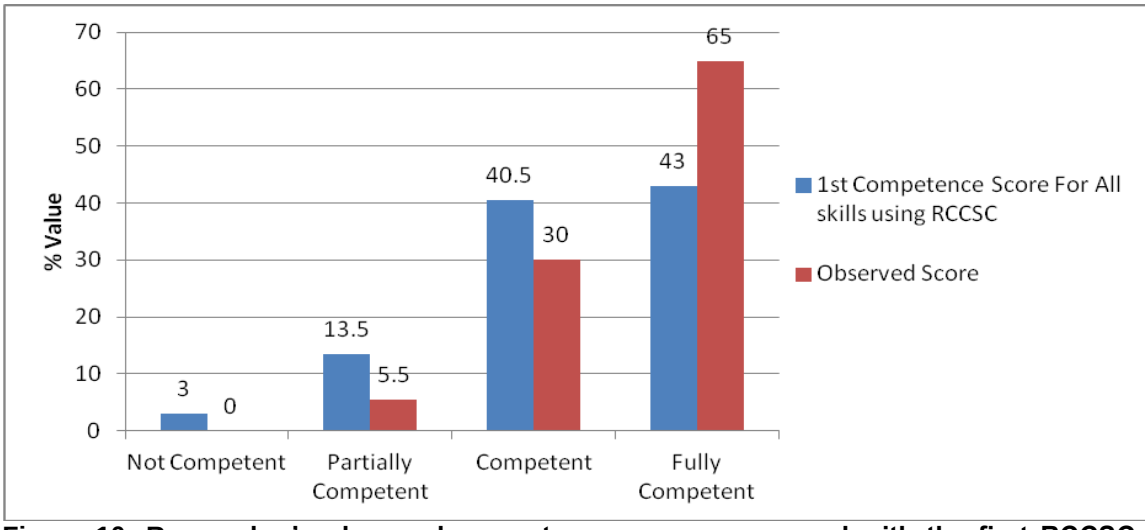

Figure 10: Researcher's observed competence scores compared with the first RCCSC combined scores

The researcher's observed competency levels for the skills observed in clinical placement were also compared with the students' combined self-assessed competency levels recorded for the same skills (Table 13).

		Researchers observed competency level for all skills				
		NC	PC	C	FC	Total
Students' self-assessed Competency level for all observed skills	NC	0	0	0	0	0 (0%)
	PC	0	2	2	1	5 (11%)
	C	0	1	7	9	17 (40%)
	FC	0	0	3	18	21 (49%)
Total		0 (0%)	3 (7%)	12 (28%)	28 (65%)	43 (100%)

Table 13: Students' combined self-assessed competence scores compared with the researcher's combined competence scores

Of the forty three recorded competency levels twelve competency levels recorded by the researcher were higher than the students self-graded competency level (above shaded diagonal). Four competency levels recorded by the researcher were lower than the self-graded level (below shaded diagonal) and twenty seven competency levels recorded by the researcher were the same as that recorded by the student (shaded diagonal). Neither the researcher nor any of the student participants recorded a 'Not Competent' level for any of the skills observed in clinical practice. Figure 11 provides a bar chart comparing the percentage frequency distribution between the researcher's and students' observed competency levels for all skills.

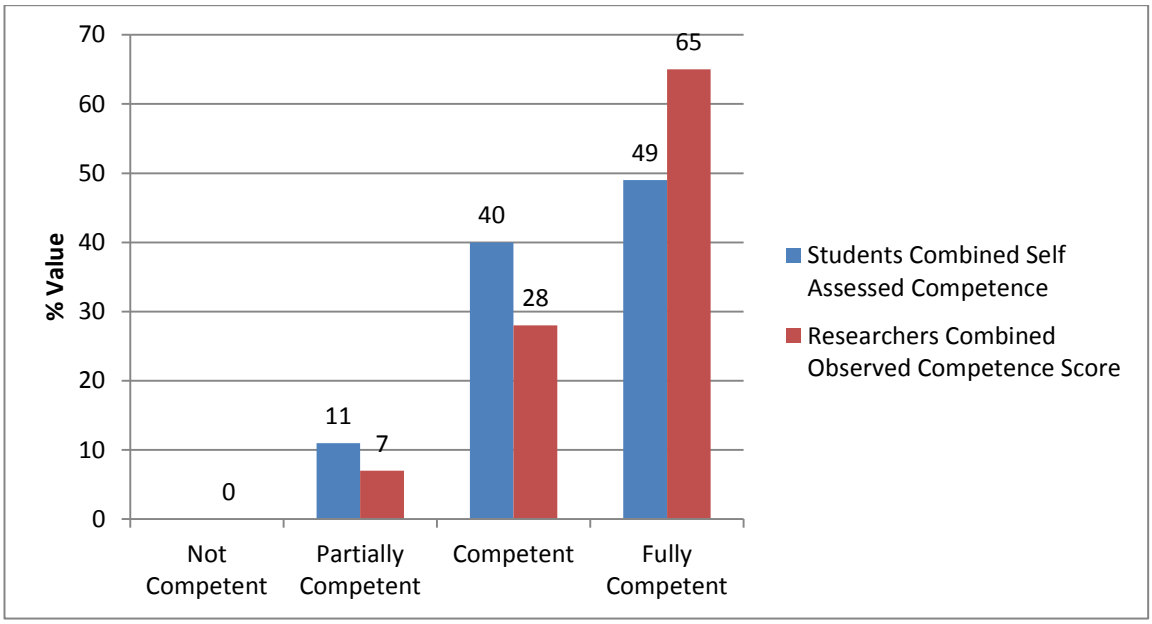

Figure 11: Combined students' observed competence scores for all skills compared with the combined researcher's observed competence scores while on clinical placement

A Wilcoxon signed-rank test found that the difference between the observed competency levels awarded by the researcher and the students' self-graded competency levels for the same clinical skills performance was statistically significant (z= -2.065, *p=0.039*).

Appendix 21 provides tables comparing the researcher's observed level with the students' self-assessment level for each of the observed skills (Appendix 21 Tables 1-3). A total of twenty two students were observed performing a hand wash in the clinical placement (Appendix 21 Table 1). Fifteen of the students (68%) had self-graded their competency at the same competency level as that

recorded by the researcher. Thirteen of these were Fully Competent (FC) and two were Competent (C). For the remaining students, the researcher recorded six students higher than their own self-graded level and one student was awarded a lower level by the researcher when compared to the self-graded level.

There were thirteen students observed performing urinalysis in the clinical placement (Appendix 21, Table 2). Out of this total, nine students (69%) recorded their performance at the same competency level as the observer, of whom four recorded Fully Competent (FC), three recorded Competent (C) and two recorded Partially Competent (PC). Of the remaining students, three were recorded higher competency levels by the researcher, who recorded a Fully Competent level whereas the student recorded Competent. One student recorded a Fully Competent level while the observer recorded a Competent level.

A total of eight students were observed performing blood pressure recording in their clinical placements (Appendix 21, Table 3). Of this group, three students recorded the same competency level as the researcher. Three students were recorded a higher competency level by the observer when compared to their self-graded level and two students were recorded a lower competency level by the observer when compared to the self-graded level

The findings show that when the researcher's recorded competency levels for the observed clinical skills performance are compared with the levels recorded by the students, there is a general tendency for the students either to under-assess their performance or to award a comparative competency level. The student who recorded a higher competency level when compared with the observer's level for the skill of hand washing was the same student who recorded a higher level for urinalysis. Two students who recorded a lower level for hand washing also recorded a lower level for their performance when compared to the observers' recorded level for urinalysis. No other patterns were found.

A comparison was made to determine if there was any significant difference between the Max RCCSC competence level recorded in the practice based learning aid and the competency levels recorded by the students for their

observed performance at the end of the clinical placement. Table 14 compares students self-assessed competency levels for each of the three observed skills (when the researcher was present) with the students self-assessed competency levels recorded in the practice based learning aid during clinical placement (when the researcher was not present).

		Students' self-recorded level when being observed by the researcher			
Students' Max level from clinical placement		Lower Competence score	Same Competence score	Higher Competence score	Total
	Hand washing	7	10	2	19
	Blood pressure	4	3	0	7
	Urinalysis	4	6	1	11
	Total	**15**	**19**	**3**	**37**

Table 14: Comparison of students' self-recorded levels when being observed by the researcher, with student self-recorded levels from placement when the observer was not present

Table 14 shows from a total of thirty seven competency levels recorded for both the observed clinical skills and the Max competency level recorded in clinical placement, nineteen levels were the same on both occasions. There were three levels recorded by students for their observed performance that were higher than that recorded as the Max level in clinical placement and fifteen self-recorded levels for the observed performance that were lower than that recorded as the Max level. Therefore when comparing students self-assessed competency levels of their observed performance with the max competency level achieved in clinical placement there was an overall tendency to grade their observed performance at either a similar (19) or lower (15) competency level than that recorded as the Max in the practice based learning aid.

Figure 12 provides a bar chart comparing the percentage distribution of competency levels for both the Max RCCSC level and the students' observed score.

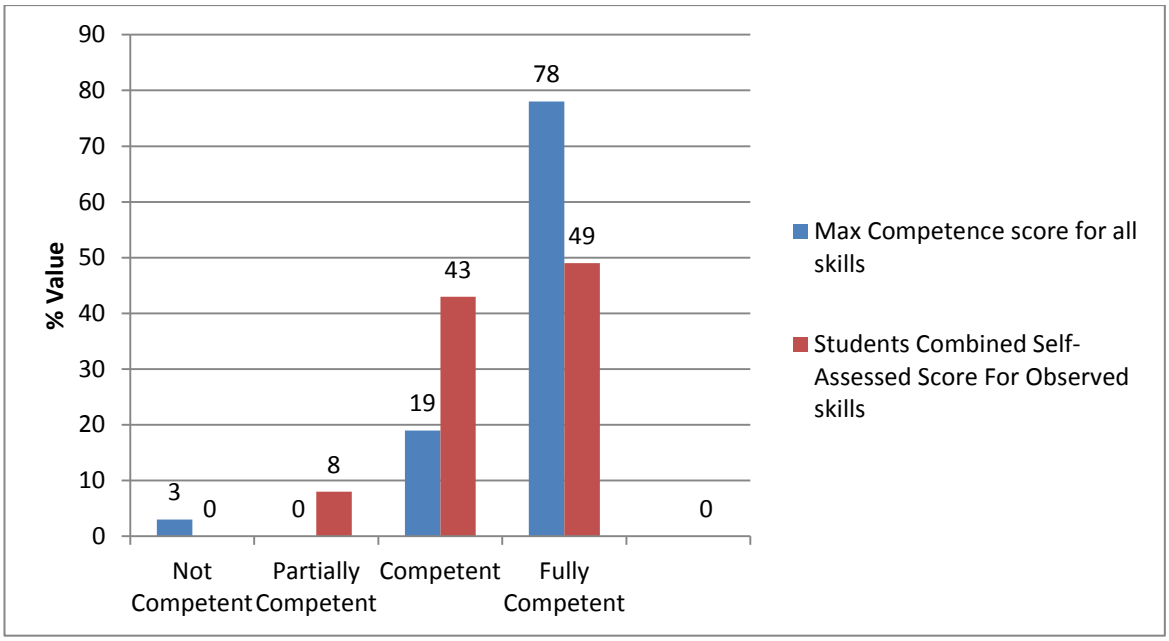

Figure 12: Combined students' observed competency levels for all skills compared with the combined Max competency levels

Figure 12 shows the notable difference between the 'Competent' and 'Fully Competent' levels for both data sets. A Wilcoxon signed-rank test found that the difference between the combined max competency levels and the combined self-assessed competency levels for the observed skills was statistically significant (z= -2.409, *p=0.016*).

The results for each of the individual skills comparing the Max RCCSC competency level and the students' self-recorded level for their observed performance, are available in Appendix 21 Table 4-6 . For the skill of Hand Washing although twenty two students were observed in clinical placement performing the skill of hand washing only nineteen of these also completed the clinical skills component of the RCCSC while on clinical placement (Appendix 21, Table 4). Of these nineteen students, ten self-recorded their observed performance of hand washing at the same competency level as the Max level achieved in clinical placement. Of the remaining students, seven recorded a lower competency level and two students awarded a higher competency level for their observed performance of the skill of hand washing when compared to the max level achieved in placement.

Eight students were observed in clinical placement by the researcher performing the skill of blood pressure recording (Appendix 21, Table 5). Seven of these completed the clinical skills component of the RCCSC for this skill. Three of the seven students self-recorded their observed performance of blood pressure recording at the same competency level as the Max level recorded in clinical placement. Of the remaining students, four recorded a lower competency level and none awarded a higher competency level for their observed performance.

A total of thirteen students observed in clinical placement performing the skill of urinalysis (Appendix 21, Table 6). Eleven of these students also completed the clinical skills component of the RCCSC for this skill. Six of the eleven students self-recorded their observed performance of urinalysis at the same competency level as the max level recorded in clinical placement. Of the remaining students, four recorded a lower competency level and one student awarded a higher competency level for their observed performance of the skill when compared with the Max level recorded in placement.

The next set of findings explore if there was any connection between the Max competency level recorded in clinical placement using the practice based learning aid when the researcher was not present, and the competency level recorded by the researcher for the observed performance at the end of the clinical placement when the researcher was present.

Only the competency levels from students who were observed by the researcher and who also completed the RCCSC in clinical placement for the same skills are included, providing a total of thirty seven recorded competency levels (Table 15).

		Students' Max level from Clinical Placement			
Researcher's Observed level		Lower Competency level	Same Competency level	Higher Competency level	Total
	Hand Washing	1	16	2	19
	Blood Pressure	1	2	**4**	7

	Urinalysis	3	4	4	11
	Total	**5**	**22**	**10**	**37**

Table 15: Comparison of researcher's observed competency level for each skill with the students' Max RCCSC level (recorded in the absence of the researcher)

Table 15 shows the competency levels recorded for each of the three skills of hand washing, blood pressure recording and urinalysis from the students max level recorded in the practice based learning aid compared with the competency level recorded by the researcher from the observed performance in clinical placement.

For the skill of hand washing (Table 15), there were nineteen students who completed self-recordings while on clinical placement and who were observed and assessed in practice. Sixteen recorded a Max level for clinical competency similar to that recorded by the researcher for their observed performance. The Max level of one of the students from placement was less than the competency level recorded by the researcher, and the remaining two students recorded their Max level for clinical performance as higher than the competency level recorded by the researcher for the observed performance.

Of the seven students who were eligible to be counted for the skill of blood pressure recording (Table 15), two students self-recorded the same competency level for their Max level performance in clinical placement to that recorded by the researcher for their observed performance. One student recorded a lower Max level for their performance in clinical placement when compared to the researcher's observed level. Four students recorded their max clinical competency level higher than the level recorded by the researcher for their observed performance.

For the skill of urinalysis (Table 15), four students recorded a Max level from clinical placement similar to that recorded by the researcher for their observed performance. Three students recorded a lower Max level for their clinical performance. Four students recorded a higher Max level for their performance in clinical placement to that recorded by the researcher for their observed performance.

There were twenty two occurrences (Table 15) when the students' self-recorded competency level from placement using the RCCSC was the same when compared to the competency level recorded by the researcher for the observed performance in clinical placement. There were five occurrences where the max level was lower when compared to the researcher's level, and there were ten occurrences where the max level was higher when compared to the competency level recorded by the researcher for the observed performance. Figure 13 provides a bar graph comparing the combined max scores recorded in the practice based learning aid with the combined competency levels recorded by the researchers from the same skills observed in clinical practice.

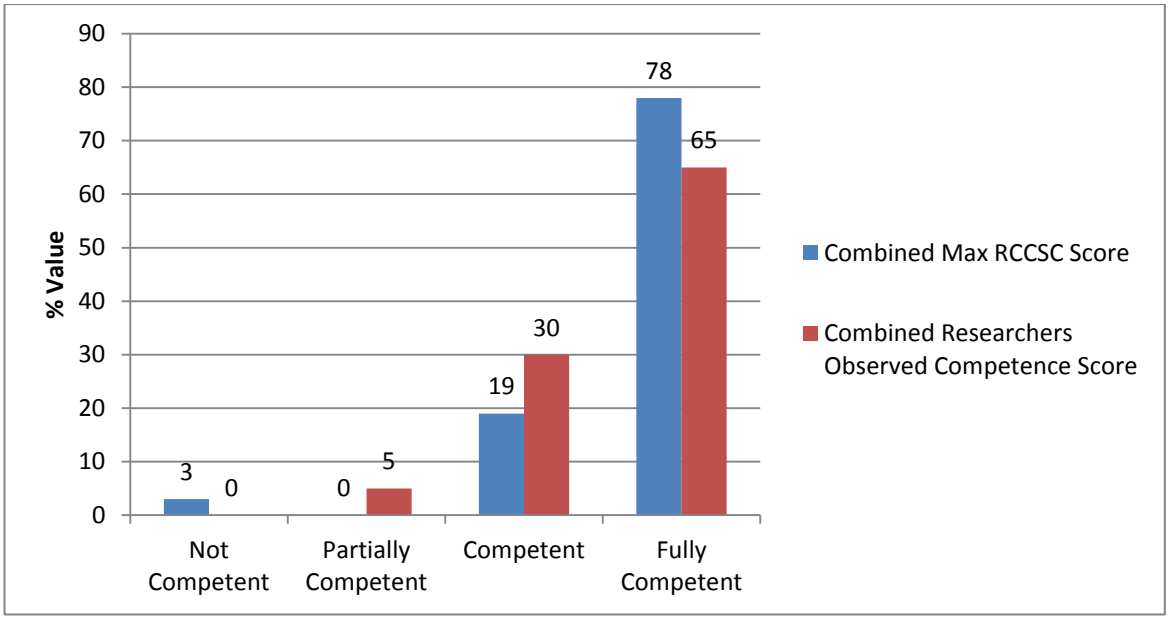

Figure 13: Researcher's observed competency levels for all skills compared with the combined Max RCCSC competency levels

Figure 13 above demonstrates the similarity between the levels from the two data sets. A Wilcoxon signed-rank test failed to show any statistical significance between the two data sets (z=1.148, *p=0.251*). The power calculation equals 94%, demonstrating that there is a 94% probability that if there were a statistical significance, it would have been found.

The data from the observed clinical skills has shown that when the students' baseline OSCE competency levels were compared with the competency levels awarded by the researcher for their observed performance, there was a

statistically significant improvement in overall competency (*p=0.04*). The results also show a statistically significant improvement in competency levels between the first competency level recorded in the practice based learning aid when compared with the competency levels awarded by the researcher for their observed performance (*p=0.024*).

The higher competency levels recorded by the researcher for the observed performance was also statistically significant when compared with the students' self-recorded level for the same performance (*p=0.039*). Furthermore, when the students' self-recorded level for their observed performance was compared to the maximum level recorded from clinical placement, there was a greater number of Fully Competent levels recorded and this difference in was found to be statistically significant (*p=0.016*). However, when the maximum competency levels from clinical placement were compared with the competency levels recorded by the researcher for the observed performance there was no statistical significance detected and the power calculation suggests that there is a 94% probability that if there had been any difference, it would have been detected.

A series of charts for all twenty seven student participants is provided in Appendix 22 Each chart plots the student's competency grade for each skill from the OSCE, the Max score achieved from clinical placement using the RCCSC, the competency grade recorded by the researcher for the observed skill and the students own recorded competency level for the same skill. Figure 14 provides an exemplar of a chart from student number 5.

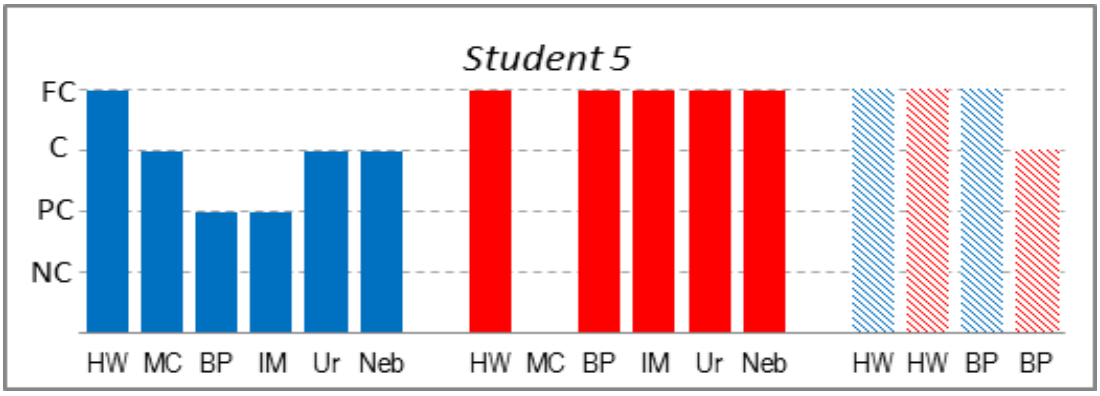

Figure 14: Student number 5: comparing competence scores achieved at the OSCE, Max score in clinical placement and the observed scores from clinical placement

The chart in Figure 14 begins with indicating the competency level achieved for each of the six skills at the OSCE (solid blue). In this example the student recorded fully competent (FC) in Hand Washing (HW), competent (C) in Mouth Care (MC), partially competent (PC) in both Blood Pressure recording (BP) and administering an Intra Muscular (IM) injection and achieved a competent level in urinalysis (UR) and administering a Nebuliser (NEB). For the Max level from clinical placement (solid red) the student recorded a Fully Competent (FC) for all of the five skills. There is no record available for the skill of Mouth Care. For the clinical skills observed while on clinical placement the student recorded a Fully Competent level from the researcher for the skill of Hand Washing (hashed blue) and recorded their own performance as Fully Competent (FC) (hashed red). For the observed skill of Blood Pressure recording the researcher recorded a Fully Competent (hashed blue) and the student recorded a Competent (hashed red).

Students numbered 7, 12, 16, 23 and 24 (Appendix 22) did not submit a completed RCCSC. Ten of the twenty seven student participants completed the RCCSC for all six clinical skills. Student's numbered 4, 8, 12, 20 and 24 were the five students who were not observed while on clinical placement. For most students the competency levels recorded in clinical placement demonstrate an improvement from the OSCE levels.

Section 4.2 has presented the findings related to recorded levels of clinical skills competency at each stage of the research. Table 16 provides actual totals of competency scores achieved for all skills and the valid percentage for each is shown in brackets.

	Not Competent	Partially Competent	Competent	Fully Competent	Total
OSCE	17 (10%)	24 (15%)	57 (35%)	64 (40%)	162 (100%)
1st RCCSC	4 (3%)	17 (19%)	36 (40%)	35 (38%)	92 (100%)
Max RCCSC	2 (2%)	6 (7%)	19 (20%)	66 (71%)	93 (100%)
Observed Score	0 (0%)	3 (7%)	12 (28%)	28 (65%)	43 (100%)

Table 16: Combined competency scores for all skills at each stage of data collection.

Closer examination of the combined scores for all students shows a general improvement in the number of fully competent scores as students' progress from the OSCE, through the first RCCSC, the Max RCCSC and the researcher's observed competency level. This can be seen in Figure 15 below.

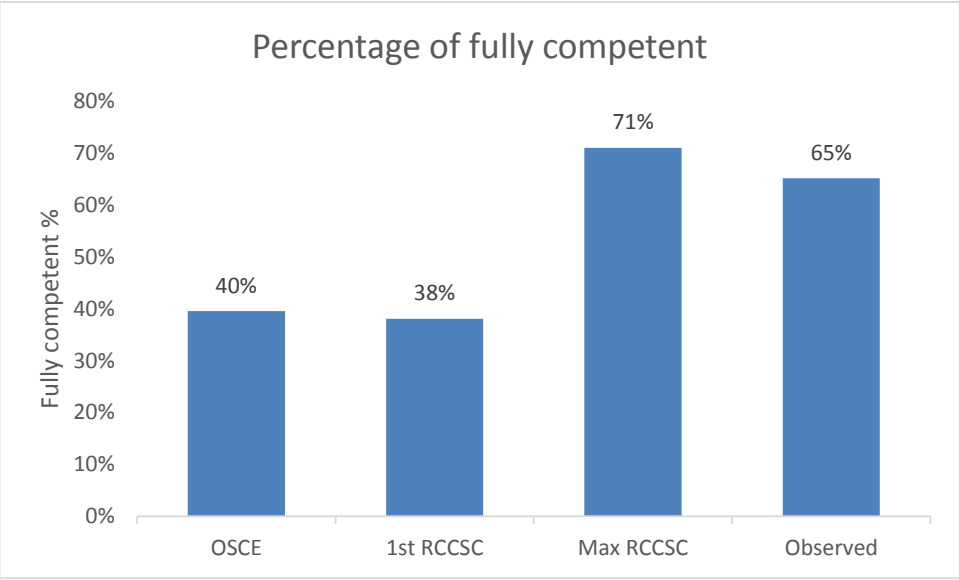

Figure 15: Fully competent scores achieved at each stage of competency data collection.

The progressive improvement between the number of fully competent levels achieved towards the end of placement (the max levels from clinical placement

and the observed competency levels) when compared with the earlier competency levels (the OSCE and the 1st RCCSC competency levels) is demonstrated in Figure 15.

Overall, the quantitative results from the clinical competency levels have shown that there was no significant difference between the competency levels in the OSCE and the first recorded levels from clinical placement using the RCCSC. However, statistical significance was found when the competency levels from the OSCE were compared with the Max levels from clinical placement and also when the OSCE competency levels were compared with the researcher's observed levels from clinical placement. Statistical significance was also found when the first RCCSC competency levels from clinical placement were compared with the Max levels and again when the first RCCSC levels were compared with the researcher's observed competency levels. The next section presents the findings from the evaluative questionnaire.

4.3 Evaluative Questionnaire Findings

This section presents the findings generated from the purposively designed evaluative questionnaire (Appendix 7) used in the quantitative strand phase of the study. The questionnaire (Appendix 7), described in section 3.6.3, was designed to evaluate students' experiences of the practice based learning aid used in this study and to explore their perception of how it influenced their clinical skills competency. All student participants (n=27) were asked to complete all the questions in the questionnaire, even if they did not have the opportunity to complete all of the skills while on clinical placement, or did not submit their completed practice based learning aid booklets. A total of 26 questionnaires were returned completed and one was returned blank. Due to assurances provided regarding anonymity, it is not known why one student did not complete the questionnaire.

4.3.1 Students' perceptions of their clinical skills competency

This section reports the results from sections A and B of the questionnaire (Appendix 7). These questions relate to the student's perception of their clinical skills competency levels for each of the six skills before beginning clinical placement (section A) and then after completing their clinical placement (section B). Students rated their perceived competency level for each skill using a rating scale based on the clinical skill competency scale used in both the OSCE and in the clinical skills component of the RCCSC where 1 = Not Competent, 2 = Partially Competent, 3 = Competent and 4 = Fully Competent. Table 17 provide details of the frequency of the student responses.

	Perceived Competency level BEFORE placement					Perceived competency level AFTER placement				
	Not Competent	Partially Competent	Competent	Fully Competent	Total	Not Competent	Partially Competent	Competent	Fully Competent	Total
Hand wash	0	2	6	18	26	1	0	2	23	26
Mouth Care	0	9	11	6	26	0	5	11	20	26
BP	1	3	14	8	26	1	1	6	18	26
IM	0	11	11	4	26	1	3	11	11	26
Urinalysis	1	2	9	14	26	1	0	3	22	26
Nebuliser	0	8	5	13	26	2	1	10	13	26
Overall Competence Level	0	11	12	3	26	0	2	11	13	26
Total Scores	2 (1%)	46 (26%)	68 (37%)	66 (36%)	182 (100%)	6 (3%)	12 (6%)	54 (30%)	110 (61%)	182 (100%)

Table 17: Frequencies of perceived competency levels BEFORE and AFTER placement

The perceived competency levels prior to beginning placement for each of the skills were combined and from these two were at the Not Competent level, forty six were Partially Competent, sixty eight were Competent and sixty six were fully Fully Competent (Table 17). For the perceived competency levels after completing placement reveal six were at the 'Not Competent' level, twelve were 'Partially Competent', fifty four 'Competent' and one hundred and ten were in the

‘Fully Competent’ range. One student perceived that their competency level in Blood Pressure recording before going on placement was ‘Not Competent’ and another student rated their competency level for Urinalysis as ‘Not Competent’.

Closer examination found that the student who rated their competency in Blood Pressure recording before going on placement as ‘Not Competent’ rated their competency level after placement as ‘Not Competent’ in five of the skills and ‘Partially Competent in Mouth Care. Therefore, five of the six ’Not Competent’ levels after placement are from one individual student; and the other was from another student, for the skill of administering a nebuliser. Figure 16 provides a bar chart to help visualise the students perceived competency levels before and after clinical placement.

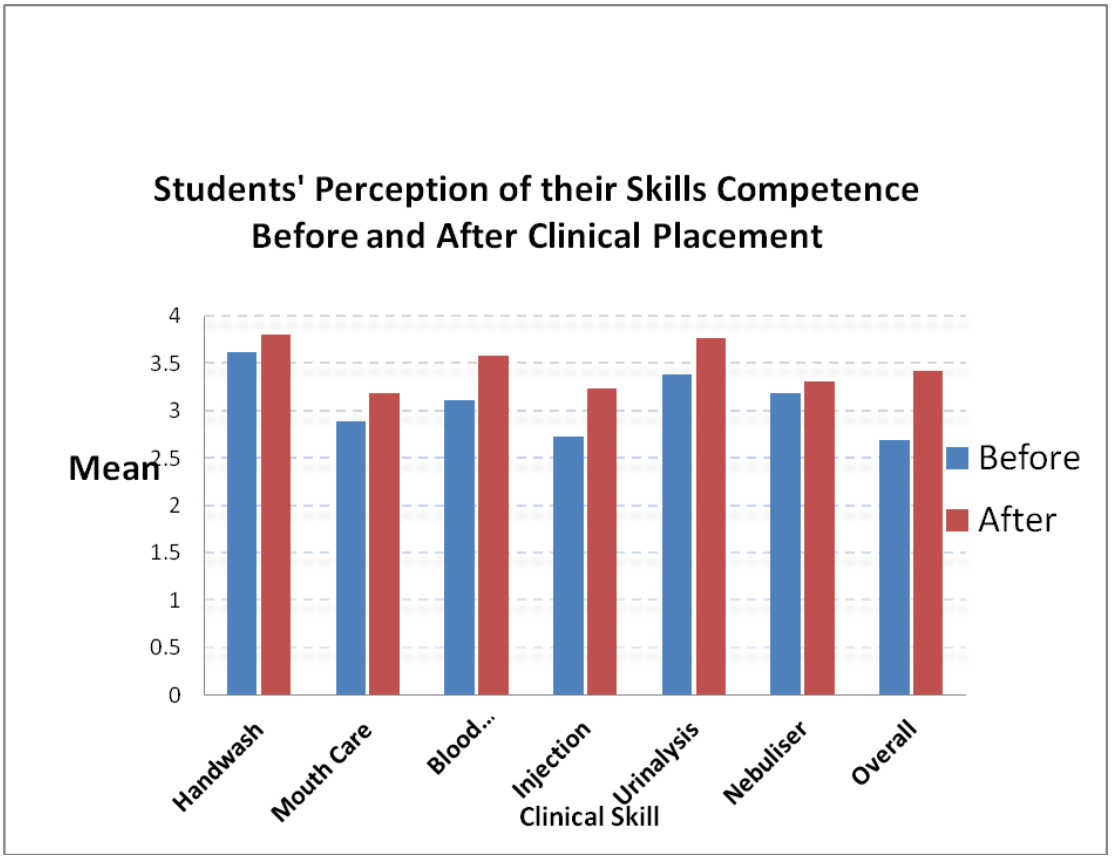

Figure 16: Total mean competency levels of students’ perception of their clinical skills before and after their clinical placement

Figure 16 shows the distribution of the calculated mean used to collate the response for each of the six clinical skills and for the question relating to overall competency. The perceived increase in competence after clinical placement is demonstrated (Figure 16). The Wilcoxon signed ranks test was used to determine

the significance of this change in mean for the students' perception of their competency in each of the clinical skills before going on placement and after completing placement (Table 18).

Clinical Skill	Z value	P Value	Significance Status
Hand washing (n=26)	-1.667	0.096	Not Significant
Mouth care (n=26)	-2.530	0.011	Significant
Blood Pressure (n=26)	-3.207	0.001	Significant
IM Injection (n=26)	-2.476	0.013	Significant
Urinalysis (n=26)	-2.496	0.013	Significant
Nebuliser (n=26)	-1.000	0.317	Not Significant
Overall competence Level (n=26)	-3.945	<0.000	Significant

Table 18: Wilcoxon signed-rank test scores on students' perceived level of competency before and after clinical placement (p≤ *0.05*).

Table 18 provides details of the individual results from the Wilcoxon signed-ranks test to determine if the difference in the levels before and after placement had any statistical significance. For each of the six skills the mean perceived competency level for each of the skills was at a higher level upon completion of their clinical placement than the perceived level of competency rated prior to commencing clinical placement. For the skill of mouth care, blood pressure recording, IM injection and urinalysis, the difference in students' perception of their competency was highly significant ($p \leq 0.02$) and even higher when comparing the perceptions of overall competency ($p < 0.001$). No significant difference was found between the means for the skills of hand washing and administering a nebuliser.

4.3.2 Students' evaluation of the practice based learning aid

This section reports the findings related to the perceived benefits of the practice based learning aid. A table providing the frequencies and relative percentage scores for the responses provided from the Likert type scale for each of the evaluative statements is available in Appendix 23.

The first evaluative statement sought to determine if students had the learning opportunity to practice and perform the identified clinical skills when on clinical placement. From the total number of responses (n=26), eighteen (69%) students either agreed or strongly agreed (43% and 26% respectively), that they had an opportunity to perform the identified clinical skills at least once while on placement. Seven (27%) students either disagreed or strongly disagreed (15% and 12% respectively) with the statement and one student (4%) was unsure.

The second statement related to whether the practice based learning aid helped develop competence in performing clinical skills. All but two students agreed; nine (34%) strongly agreed, fifteen (58%) agreed and two (8%) were unsure. None of the students disagreed with the statement. A statement exploring if students believed that the practice based learning aid helped in the development of their knowledge followed, from which eight students (30%) strongly agreed with the statement, fifteen (58%) agreed, and three (12%) were not sure. None disagreed with the statement.

The next statement related to whether the practice based learning aid helped students to have a better understanding of the patients' experience when performing clinical skills. Four (15%) students strongly agreed and twelve (47%) agreed with the statement. There were nine (34%) students who were not sure, and only one student (4%) disagreed. Students were then asked to identify whether the learning aid encouraged them to engage in reflection of their clinical skills performance. There were twelve (47%) of the students who agreed and thirteen (49%) who strongly agreed with the statement. Only one student (4%) was unsure and none disagreed.

Continuing on the theme of the learning process the sixth evaluative statement sought to identify if the students agreed that it helped them to remember the sequence of steps for each of the clinical skills. Over half the students (15 = 58%) strongly agreed with the statement and nine (34%) agreed. There were two students (8%) who were unsure and none who disagreed.

The final three statements related to aspects that might be improved. Eleven (42%) students agreed and ten (38%) students strongly agreed that more skills should be added to the practice based learning aid. One student (4%) was unsure, three (12%) disagreed and one (4%) strongly disagreed with the statement. Fourteen (54%) students strongly agreed and six (23%) agreed that the learning aid should be provided to all students to help develop their competency. Five (19%) students were unsure and one student (4%) strongly disagreed. Responses to the statement that the RCCSC was easy to use found fourteen (54%) students strongly agreeing and nine (34%) agreeing. Two students (8%) were unsure and one student (4%) disagreed.

The questionnaire also explored how often students referred to the learning aid before performing a clinical skill. Out of the twenty six responses, three indicated ‘never’, nine indicated ‘rarely’, twelve identified that they referred to the RCCSC ‘occasionally’ before performing a skill and two students indicated ‘most times’. None of the students indicated that they ‘always’ referred to the RCCSC booklet before performing a clinical skill. Figure 17 provides a bar chart comparing agreed and not agreed responses to the evaluative statements.

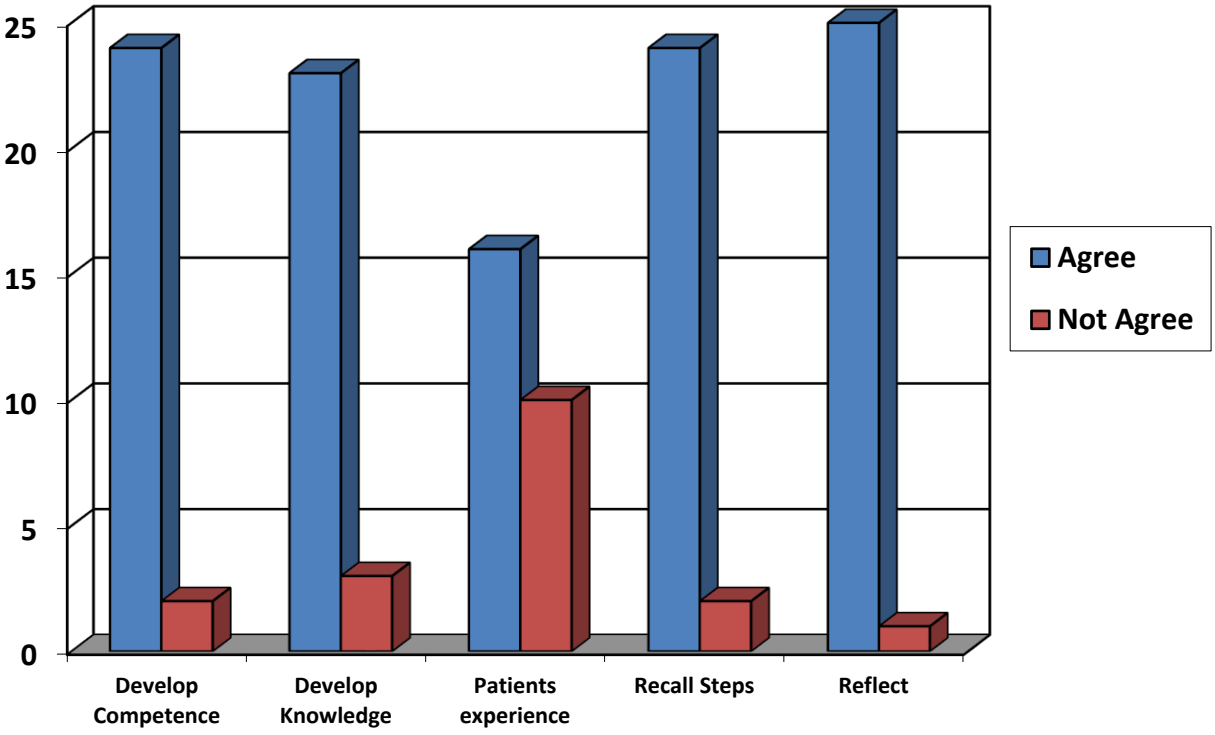

Figure 17: Students' response to the evaluative statements (n=26)

Responses to the evaluative questionnaire (Appendix 7) found that overall, the students related positively to the practice based learning aid implemented in the study. There is a general perception among the student participants that the approach has helped to improve their clinical skills competency. This corroborates the quantitative findings from the competency levels recorded at the OSCE and from clinical practice demonstrating an improvement in the development and transfer of clinical skills competency to the practice setting of nursing, post theoretical instruction, thereby bridging the theory-practice gap. The quantitative findings presented in Chapter 4 are discussed in Chapter 6 integrating the qualitative findings presented in the next chapter, Chapter 5.

Chapter 5: Findings from the Qualitative Strand of the Study

Introduction

This chapter presents the findings from the qualitative strand of the study and includes the findings generated from the focus group analysis, and from the students' written reflective comments collated during their clinical placement. These findings generate data to help answer the research question and specifically contribute to meeting objectives 3 and 4 exploring the influence of the practice based learning aid on students' competency. The analysis framework used is based on Onwuegbuzie and Teddlie's (2003) framework for data analysis in mixed-methods research (Appendix 15). Analysis of the qualitative data was guided by Miles and Huberman's (1994) framework as described in section 3.12. Further synthesis and integration of all the data into a coherent whole is provided in Chapters 6 and 7, where conclusions are drawn as a plausible explanation for the underlying data. The qualitative findings provide a deeper understanding of the complex learning and reflective processes involved during the operationalization of the RCCSC. The findings create a more accurate picture of the effectiveness and the educational benefits of using the RCCSC as a learning aid for the development of competence in clinical practice among undergraduate nursing students.

5.1 Focus Group Findings

The focus group generated rich data within the qualitative strand of the explanatory-sequential design phase of the study. Its purpose was to explore further the responses provided in the evaluative questionnaire and to add further to the understanding of the perceptions of the student participants as to the benefits of the educational approach and the use of the practice based learning aid. The schedule for the focus group therefore dictated a more directive approach. A focus group interview schedule (Appendix 8) was designed to probe specific topics rather than generate a more open discussion (Parahoo, 2006). This form of group interview is often used in flexible designs, especially where qualitative data is required to clarify and illustrate the meaning of findings from a quantitative study (Robson, 2011). The focus group assisted in identifying and

clarifying the factors that help to develop and maintain competency in clinical skills among the undergraduate nursing students (Krippendorff, 2013). Three predominant themes emerged from the focus group analysis: pre-requisites to learning; conducive learning factors; and unconducive learning factors. Each of the three predominant themes identified was grounded in the data and has been named to reflect the meaning of the concept and the collective sub-categories and codes within each. Quotations taken directly from the focus group interview are provided in order to demonstrate the key themes, sub-categories and codes. A full transcript of the focus group interview is provided in Appendix 13 and the extrapolating of themes and categories can be viewed Appendix 16. Figure 18 below provides a diagrammatical view of the three predominant themes to emerge from the analysis.

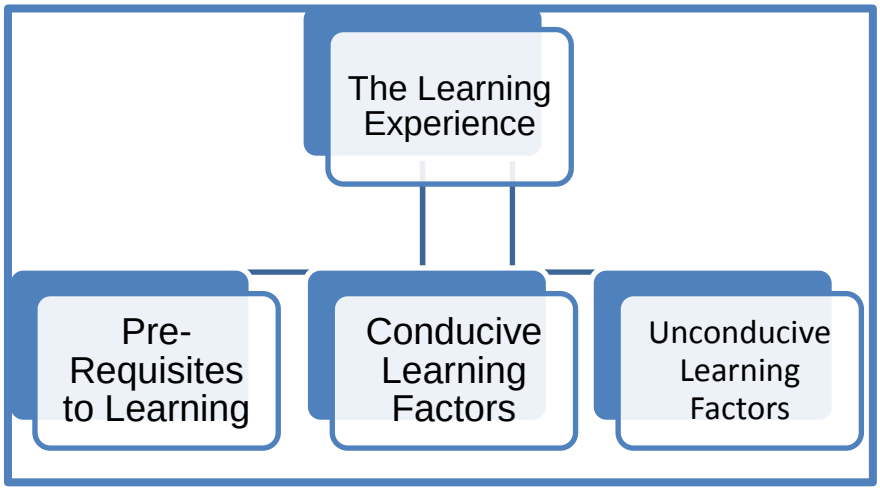

Figure 18: The predominant themes identified from the focus group

Each of the themes identified in Figure 18 is discussed below, beginning with the prerequisites to learning. Diagrammatic presentations for each of the themes are available in Appendix 24 Figures 1, 2 and 3.

5.1.1 Theme 1: Prerequisites to learning

The first theme, identified from the analysis of the focus group discussion is pre-requisites to learning (Appendix 24, Figure 1). In the discussion of the learning experience a number of factors emerged that reflected the essential qualities that a student should possess as a necessity for learning in the clinical placement. These included factors that were motivational in nature and factors that related

to the student's own concept of self. Together these two factors construct the first predominant theme to emerge from this data.

Motivation was identified as one of the two sub-categories of the prerequisites to learning theme and was extrapolated from the data based on comments made by the students which reflected a perception of level of motivation that was necessary for learning:

> "*Yea, on these placements you're asked to do something. You just want to do it, you're keen to do it,"* (Quote 49)
>
> *"You're so keen to do it. You do it for the experience*" (Quote 52)

The quotations above are examples taken from a discussion on their clinical placement experience. When asked to perform a skill by a staff nurse or given the opportunity to perform a clinical skill while in the practice placement, they were keen to gain the learning experience and demonstrate a level of motivation to learn. Motivation was further demonstrated when reporting that they were keen to seek out learning experiences:

> "... *you don't want to be holding back" (from a learning opportunity)* (Quote 53*)*
>
> "*Well as far as I'm concerned if the opportunity arose I took it ... it's as simple as that*" (Quote 103)

Quote 53 refers to not wanting to '*hold back'* from getting the opportunity to perform a clinical skill while on placement and thereby learn from their experience and develop their clinical skills competence. These quotations demonstrate a level of both intrinsic and extrinsic motivation and reflect the concept of cognitive growth needs identified by Maslow and Lowery (1998) as needing to know and understand. The student in quotation 103 further demonstrates this level of motivation to learn when talking about taking every learning opportunity to practice their clinical skills while on placement.

The theme of motivation was also demonstrated when discussing how to improve the RCCSC booklet:

> *"It would be better to have more points that were patient focused in the steps to remind you about 'don't forget there is a patient at the end of this'. It's not just a thing you're doing there is an actual person there."* (Quote 217)
> *"I think patient orientation, how to approach a patient, how to talk to patients, that kind of thing. Maybe for these type of placements, looking at communication skills, for example."* (Quote 250)

> " … *Maybe if this booklet* [RCCSC] *was more like communication, how you talk to patients in psychiatry, care of the elderly, paediatrics, maternity. There wasn't much I could do anyway, but definitely I could build up my communication skills … That would be more beneficial ..."* (Quote 252)

Currently the RCCSC has a greater focus on the cognitive and psychomotor elements of the clinical skills that were used for the OSCE but the quotations demonstrate the students' awareness that future development could include those skills that are more aesthetically orientated, such as communication skills, and also focus a little more on the patient's experience. This was also identified in the evaluative questionnaire and is discussed further in this chapter. However by highlighting areas that would improve future learning, the students have demonstrated a level of motivation to develop their clinical competence.

Comments from the focus group transcript (Appendix 13) discussed the role of the staff nurse when delegating skills to the students. The students appeared to have a perception that there was an expectation from clinical staff that, as second year students, they should have acquired a level of competence in performing clinical skills:

> "*They* [clinical staff] *think you should know a hell of a lot in 2nd year*" (Quote 58)

> *"Yea, it's like there's a massive difference. Like first year you can get away with a lot but in second year, well like you should know stuff now*." (Quote 59)

The students are referring to having to '*know a lo*t' when talking about the level of competence they perceive that staff expects from them. The students recognise that there is an expected increase in clinical competence between first and second year, acknowledging that while in first year they could possibly '*get*

away' with a lack of knowledge or skills, this is no longer the case. The examples provided demonstrate that the perceived expectation acted as a key motivator to learning. Further affirmation was provided from the group that they felt there was a certain expectation from qualified staff that they would have better skills.

The students also wanted to demonstrate to the qualified nursing staff that they were competent and keen learners:

> "*Yea but you want to show your preceptor that you can do skills, you want to reassure them so that they'll give you more opportunities to do more. So that they'll say 'oh she actually knows that' then you're grand cause they're always asking 'are you sure you know what to do?'*" (Quote 229)

This keenness for recognition is identified in Knowles' (1984) seminal work on adult learning, as one of the components of intrinsic motivation. The students want to show their preceptor what they can do, and the quotation above demonstrates a need to be deemed a competent student and feel accepted by the qualified nurse. There is also a perception that the competent student would be rewarded with further learning opportunities. The following response was provided when asked to clarify if, as a second year student, there was still a need to demonstrate to staff that they were able and competent:

> "*Especially in short placements because you're only there for a short time and they don't get to know you*." (Quote 231)

Contextually this statement demonstrates that the student had a need to feel accepted by the qualified staff on the ward. She was concerned that there was not enough time for the staff to get to know her and this perception was affirmed by other students within the group. Overall it seems that the students were keen to learn and develop their competence. There was a perception that staff had an expectation of the level of competence that the student should possess and this, in turn, acted as a key motivator for the students.

The second sub-category identified within the theme of pre-requisites to learning was self-concept. This was constructed with codes that reflected the adult learning concept of self (Knowles et al, 2005) and includes the students' perception of their ability to perform clinical skills competently within the context

of their practice. As part of the discussion within the focus group, students commented on their perceived level of competence following completion of the theoretical and simulated learning components of the education approach and assessment by OSCE.

> "*I felt competent after the OSCE.*" (Quote 65)

The statement suggests that the student felt competent in their ability to perform clinical skills in practice, and this perception was affirmed by other members of the group. When the group was asked if they also felt confident in their ability to perform clinical skills following completion of the theory and simulated learning, most students confirmed that they did, and they appear to recognise the importance of the OSCE in the development of competence in performing clinical skills.

One student identified prior experience as a factor in building confidence:

> "*Yea*, [referring to feeling confident] *but maybe it's because I'm a mature student and I have 20 years' experience working in hospitals anyway, probably would stand to me*." (Quote, 236)

There is a suggestion that this feeling of confidence may be related to the fact that the participant was a mature student who had many years' experience working as a care assistant in the hospital setting. It highlights how prior experience is related to self-concept and that learning from experience, as discussed earlier in reference to Kolb's (1984) work, has a direct influence on perceptions of confidence and competence levels.

Students also identified the benefit of the training provided relating to the use of the RCCSC as a learning aid for clinical practice:

> " ... *it was fairly straight forward,* [the process of using the RCCSC] *like we'd used it before. You know, for the OSCE.*" (Quote 209)

This statement was affirmed by other group members and highlights the students' familiarity with the RCCSC for reflecting on their performance of clinical skills and identifying their competency level. They had previously used the RCCSC to assess their own level of competency and reflect on their simulated experience

during the OSCE and found the transition to using the RCCSC in clinical placement '*fairly straight forward*'.

The sub-category of self-concept, therefore, relates to the feeling of confidence expressed by students and can be directly related to prior learning experience including theory, simulated learning, OSCE and the practice based learning aid. It differs from the sub-category of motivation but has a direct relationship to the overall theme of prerequisites to learning, embracing the factors required for positive learning to take place (Appendix 24, Figure 1).

5.1.2 Theme 2: Conducive learning factors

The second theme to emerge from the analysis relates to those factors that were identified as being conducive to a positive learning environment. This theme contains five sub-categories: learning opportunity, memory aid, self-assessment through reflection, repetition and embedded learning. Details of the identification of sub-categories and codes for the predominant theme of Conducive Learning Factors are provided in Appendix 16 and a diagrammatic presentation is available in Appendix 24, Figure 2.

Producing a climate that is conducive to learning is identified as an important factor in influencing the learning process for adult learners (Newton et al, 2010; Knowles, 1984). Within this study, the identified theme relates to the actual learning experience of the students and the learning process that occurred while using the RCCSC in clinical placement. Data from the transcript of the focus group demonstrated that students were engaging in the learning process and they identify the activities that had a positive impact on their learning.

The first sub-category identified within this theme is 'learning opportunity'. Some of the discussion related to the nature of the clinical placement and the availability of appropriate learning opportunities for the students to practice their clinical skills. The nature of the specialist clinical placements to which the student participants in this study were allocated provided a range of opportunities to perform clinical skills, some of which were not included in the RCCSC. The students identified that they were provided with opportunities to perform clinical skills such as nasogastric feeding and wound dressings. These are two examples

of clinical skills which, although not currently included in the RCCSC, should be considered for inclusion in subsequent versions. The students understood the relationship between the nature of the clinical placement and the learning experience provided. The relevance of the speciality within the clinical placement in providing a more appropriate learning environment to practice the particular the skills included in the RCCSC was also identified:

> "…*I think that after doing 2nd year and going out to our placement in 3rd year it would be much more benefit because medical wards and surgical wards are going to lend themselves much to them sort of skills* [i.e. the skills included in the RCCSC] *anyway*." (Quote 175)

The above quotation highlights the view that medical and surgical wards would be more appropriate for the skills currently included in the RCCSC than the specialist wards and reinforces the need for the inclusion of additional skills in subsequent versions.

The final code in this sub-category was the relevance to skills training. The following quotation highlights the student's perception of the importance of having the appropriate learning opportunity to practice skills in order to develop clinical skills competency; if the opportunity for practice is not available then competency is difficult to achieve:

> "*I think that if I was going back to a medical ward for 6 weeks in September and you gave me that book* [the RCCSC] *I'd come back with it full. I'd be competent in all them skills, no bother, it's just in the specialist placement you didn't get to do them all* [skills included in the booklet]". (Quote 244).

The student is referring to the fact that on a general medical ward there would be an opportunity to perform all of the skills included in the RCCSC and therefore, by having that opportunity, they believe that they would be able to complete the reflective and competency grading components for each of the skills and become competent in all of them. However the nature of the specialist placements meant that they did not always get the learning opportunity and this might have a direct impact on their competency. The student is recognising the importance of having the opportunity to practice the skill during clinical and so develop their competency.

Part of the focus group discussion was to establish the relevance of the skills included in the RCCSC. Students were specifically asked if the skills included in the RCCSC were appropriate to their clinical placement:

> "*Yea for first year or third year in medical or surgical*" (Quote 248)

This statement was affirmed by the group and suggests that although these students were second years, they believed that the skills included in the RCCSC were directly relevant to the medical and surgical placements generally allocated to the first years or third years on their programme, rather than their current specialist placements.

The RCCSC was designed as a practice based learning aid to supplement the theoretical and simulated learning and promote the transfer of competency from the simulated environment to clinical practice. It included a number of specific clinical skills that the students were to gain experience in and subsequently develop their competency in that skill. Each clinical skill was broken down into a series of 'steps' or 'tasks' that the student would perform in order to complete the skill successfully. One of the aims of the booklet was to act as a prompt and/or as an *aide mémoire* for the students while on placement. Part of the process of using the booklet was to refer to it prior to performing a clinical skill, to revise the various procedural steps required to complete a skill. The next sub-category identified, therefore, collates the codes directly related to the concept of 'memory aid'. The following quotation from the focus group transcript is taken from an excerpt where the students were discussing how the RCCSC helped them to recall the procedural steps required to complete a clinical skill:

> "… *I just thought it* [the RCCSC] *made you more aware of, kind of, you know, the steps to take when you're doing a task or something and, do you know if you felt you needed to look at the book or whatever*" (Quote 4)

The following response was provided by one of the students when the group were prompted to clarify if the booklet helped the student to quickly recall the procedural steps for the clinical skills included in the RCCSC booklet:

> "*I think that once you've looked at it once you kind of know the steps. Like I felt that I didn't know them because it had been nearly a year* [since the last clinical placement] *but like when I looked at the booklet I knew them* [the steps] *and like didn't need to look at them again but like I knew they were there*". (Quote 36)

It is clear from the student's comments that there was a perception that the RCCSC was useful as a memory aid by helping the students to recall prior learning gained in the classroom and, specifically, the procedural steps required when performing clinical skills competently. Memory is recognised as a key concept in cognitive information processing theory (Surgenor, 2010), as it relates to the ability to recall information that has previously been learned (Miller, 2011). The evidence suggests that including the procedural steps for each of the skills in the RCCSC facilitated memory recall of prior theoretical and simulated learning. The RCCSC was therefore conducive to the nursing students' learning by influencing the transition of prior learning to clinical practice.

The focus group discussion aimed to explore further the students' evaluation of the educational approach used in the study with a particular emphasis on the RCCSC and its potential as a practice based learning aid for other students. The following excerpt highlights the participants' perception that the RCCSC has the potential to act as an *aide mémoire* for other students to help with their learning:

> "… *If they looked at it* [the RCCSC] *they'd know how to do it* [the clinical skill] *if they hadn't looked at it in a while*." (Quote 179)

The analysis of the data from a discussion on how to improve the RCCSC demonstrated that the students valued the learning aid as a reminder of the steps for each of the clinical skills. Further analysis revealed the RCCSC also acted as a stimulus to learning:

> "*I would just like to say, the type of placements we were on, it wasn't like, I mean there wasn't a huge amount we could actually do on them, but having the booklet made we could actually do, we knew we could do certain skills and we could concentrate on those skills*." (Quote 12)

Due to the nature of some of the specialised placements, therefore, students were not sure about what skills they were allowed to engage in. The inclusion of skills in the RCCSC acted as a stimulus to learn by prompting them as to what skills they should be seeking opportunities to practice. As a means of member

checking the researcher sought clarification by asking the students if they thought they would have sought out learning opportunities had they not had the learning aid. The affirmation by the group suggests that they believed that if they did not have the RCCSC with them in placement, they would not have actively sought appropriate learning opportunities related to the listed clinical skills.

The third sub-category to emerge with the theme of conducive learning factors was that of self-assessment through the use of reflection. A fundamental aim of the educational approach was to promote reflective practice. The practice based learning aid required students to reflect on their performance and, through this reflection process, identify their clinical skills competency level. Schön's (1983) seminal work refers to two types of reflection when discussing how professionals learn. The first is 'reflection-in-action' and refers to making decisions about a situation as it is occurring. The following comment was made during a discussion on the benefits of the practice based learning aid, and was affirmed by the group:

> *"…. It* [the practice based learning aid] *gives you time to reflect kind of*" (Quote 266)

This is supported by further evidence that students engaged in reflection 'in action' by thinking about the 'steps' while actually doing the task:

> "….*you perform it* [the clinical skill] *and you're assessing yourself as you're doing it anyway*". (Quote 38)

Schön (1983) also refers to 'reflection-on-action', which is the process of looking back at thoughts, feelings and behaviour during a particular situation, and carefully examining what was successful, what could have been done differently, and the reasons behind this. The crucial aspect of reflection, however, is not to just recall an incident, but to learn from it. Students reported that the practice based learning aid prompted them to reflect 'on action':

> "*... we were more inclined to do the actual task itself and then look at the book* [RCCSC]*…"* (Quote 220)

> *"….I would have gone through the process of doing it and then afterwards seeing if, did I do all the steps*." (Quote 40)

> *"…I looked at the book* [RCCSC] *after to see if I'd gone through the whole process correctly*" (Quote 53)

These excerpts from the focus group discussion illustrate how students engaged in the reflective process during their clinical experience and how this reflective process assisted in helping the students to identify their own clinical skills competency levels. The process of using the RCCSC in clinical practice required that after completing a clinical skill, each student would take the time to reflect on their performance, check if all the required procedural steps were completed and then grade their performance, using the competency grading scale provided. The quotations confirm that the RCCSC encouraged the students to take time out to reflect on their practice.

The following two quotations relate to students using the competency grading scale provided (Appendix 5);

> "*It* [using the level descriptors] *was fairly easy, yea*." (Quote 206)

> "*I agree, it was fairly straight forward, like we'd used it before. You know, for the OSCE"* (Quote 209)

These excerpts highlight that the students had little difficulty in using the competency scale when grading their performance through reflection, an opinion which was affirmed by the group.

Repetition of a task and continuous reflection is part of the rehearsal and encoding process referred to in cognitive information processing theory (Surgenor, 2010). Evidence of the RCCSC encouraging students to engage in this process was extrapolated from the data, creating the next sub-category within this theme. The following excerpt is from one student relating to implementing it in practice:

> "*Yea, I filled in all the hand-washing because I had washed plenty of times* …" (Quote 105)

The reference to 'filling in' relates to completing the performance checklist and competency grading scale components of the RCCSC for the skill of hand washing and demonstrates that there were plenty of learning opportunities to practice the skill while on clinical placement. There was some discussion among the students regarding the number of self-recordings that would be required before the reaching a fully competent

level. One student suggested two would be sufficient (Quote 195); another suggested two or three (Quote 197) and most of the group were inclined to agree. Using member checking, further clarity was sought by the researcher and when asked if they would feel confident in their ability to perform a skill competently after completing two self-recordings, students responded:

> *"It's like you do something once and then like you kinda go well you know I've done that so that when you've done it a 2nd time you feel well, yea, I am confident."* (Quote 200)

> *"… I thought that for some of the skills you kinda do need three (self-assessments). Like for the more complicated ones but for the hand-washing you had it done once."* (Quote 203)

The excerpts above help to illustrate that the students were aware that a number of self-recordings of their performance in each skill, using the RCCSC, would be necessary before they would reach a satisfactory competency level. This number varied depending on the perceived difficulty or complexity of the particular skill. It also highlights the role of repetition and practice in the process of learning and developing competency in clinical skills. As a construct to the theme of factors conducive to learning, repetition as a sub-category collates the data which demonstrates how having completed the skill once and reflected on it, the student then repeats the skill, learning from their reflection and continues this process until competency is reached.

The final sub-category within the theme of factors conducive to learning is that of 'embedded learning.' This follows on from the previous sub-categories. As one student asserted, the procedural steps can become embedded:

> "*The steps do sink in*." (Quote 182)

Contextually, this comment relates to a discussion identifying the perceived benefits of the practice based learning aid. The quotation highlights that learning has been achieved. The student reports that they feel that the steps of the skill has been memorised. The analysis suggests that the student has now encoded the information or steps of the skill, which are stored in the long term memory ready for future retrieval when required, referred to as the final stage in cognitive information processing theory (Surgenor, 2010). The students also reported feeling competent in their performance of the clinical skills after completing the

self-assessments, as demonstrated by the following quotation and affirmed by the group:

> *"Its kind like you do something once and then like you kinda go well you know I've done that so that when you've done it a 2nd time you feel well, yea, I am confident."* (Quote 200)

The students talked about feeling confident in their performance and ability and one student perceived that the RCCSC would be beneficial to others in gaining confidence in performing clinical skills:

> "*It* [the RCCSC] *would give them confidence like. If they looked at it they'd know how to do it* [the clinical skill] *if they hadn't looked at it in a while."* (Quote 179).

A further student highlighted how the RCCSC was more useful for those skills that were perceived as difficult:

> "*It was useful like you know, for some of the more difficult skills like I.M* [intra muscular injection] *but for hand-washing there wasn't much need for it anymore because everyone knows how to do it by now."* (Quote 29)

In this quotation the student perceives competency in the skill of hand washing has been achieved and no longer has to refer to the RCCSC as a memory aid. As discussed in the literature review, competence also necessitates a cognitive element (2.1). The following quotation relates to a discussion on the skill of measuring and recording blood pressure:

> *If I thought it* [the blood pressure reading] *was totally out of the range, I'd do it again*." (Quote 166)

The example above demonstrates that cognitive knowledge has been achieved by the student in recognising the normal range of blood pressure and knowing that if a measurement was outside that range, the measurement should be checked again. As part of the construct of embedded learning, analysis from the focus group suggests that the students have achieved a level of 'conscious' or even 'unconscious' competence. This is the final stage of the competence conscious learning model, the origins of which are unclear but which is commonly attributed to the work of Noel Burch in the 1970s (Kilgallon and Thompson, 2012), where competence is achieved when the student can perform procedural tasks independently following assessment using a procedural competence checklist.

5.1.3 Theme 3: Unconducive learning factors

The third theme identified is unconducive learning factors (Appendix 24, Figure 3). While the student participants in the study reported on concepts which had a positive impact on their learning, they also reported concepts that they identified as not being conducive to their clinical learning, and the identified the sub-categories of environmental, personal and interpersonal factors.

The first sub-category identified is environmental factors. Downie and Basford's (2003) core test on teaching and assessing in clinical practice suggests that the learning environment not only refers to the people who work in the placement but also the kind of nursing that is practiced there and its influence on students' learning. Muldowney and McKee's (2011) study of 64 nurses across five Irish teaching hospitals used Dunn and Burnett's (1995) Clinical Learning Environment Scale, designed for undergraduate nurses, to measure perceived factors that influence clinical learning. They concluded that providing a clinical learning environment that is conducive to mastering clinical skills is a key component of ensuring clinical competence and alleviating anxiety. Analysis of the focus group data generated by the current study demonstrated that students were aware of their learning environment and were able to identify factors that had a negative influence on their learning. Selective coding resulted in a number of different environmental factors being identified.

The following is a quotation from a student during a discussion on why some of the students may not have completed all the components of the RCCSC and was confirmed by others in the group:

> *Time concerns? Like you might not have thought about looking at the book before you did the skill and then you kinda like at the end of the day or like later you thought 'oh yea I did that skill so I'll assess myself on it now but you've not looked at the steps before it.*
> (Quote 35)

It is difficult to determine if the student is referring directly to her own experience for not completing all the components in the RCCSC or whether she is surmising the reasons others might have for not doing so. It is clear, however, that time constraints were identified as a negative factor. Students also found that the type of nursing care being practiced in each clinical placement did not necessarily

provide the learning opportunity to gain experience in all of the clinical skills included in the RCCSC:

> *"I would just like to say, the type of placements we were on, it wasn't like, I mean there wasn't a huge amount we could actually do on them* …" (Quote 12)

> *"Well in the specialist placements I mean you're not going to get to do mouth care that much. Well I don't think you are anyway*." (Quote 82)

> *"I didn't do any mouth care."* (Quote 85)

> *"The nature of the placement didn't lend itself to doing those particular skills"* (Quote 88)

Although these comments relate to the earlier sub-category of learning opportunity identified in the theme of factors conducive to learning, the examples here are taken in context and identify the negative effect of not having the learning opportunity. The students were indicating that the nature of some of their clinical placements did not create a learning environment that allowed them to gain the experience to practice all of the skills included in the RCCSC. For example, mouth care is specifically mentioned twice as one of the skills that some students were unable to practice and this supports earlier quantitative findings (4.2) that only four students completed this skill component in the RCCSC while on clinical placement. Some students believed that this lack of practice reduced their confidence, an assertion that was affirmed by members of the group:

> *"It's more a thing on the wards* [the ability to practice skills]*, but you're not going to be doing mouth care in A&E or mouth-care in Psych* [Psychiatric Ward placement]. Y*ou know? So by not getting practice it reduces your confidence."* (Quote 84)

Students particularly commented that they felt very restricted on the paediatric ward and on the maternity unit and this was confirmed by the group:

> *"…In the paeds ward and in the maternity ward those skills* [the skills in the RCCSC booklet] *just didn't happen. I didn't get to do any …"* (Quote 105)

> *"You can't do anything in paeds anyway."* (Quote 107).

What the students were referring to here is that, as the participants were nursing students, the skills they were allowed to practice were restricted by policy. For example, they are not allowed to administer medication to children, which excludes the skills of nebuliser administration and IM injection, both included in the RCCSC.

Other reasons for missing learning opportunities were also mentioned and are highlighted in the following examples:

> *"You might feed a baby or you might get a chance to wash a baby but the parents were always there doing everything."* (Quote 115).

> "*Yea but the parents were always there anyway."* (Quote 113)

Students are asserting that learning opportunities were missed because the parents were often at the bedside, providing necessary care both in the children's ward and on the maternity unit.

Other factors identified within the environmental factors sub-category were related directly to the practicality of the RCCSC booklet. The following excerpts are taken from the discussion related to the practicality of implementing a practice based learning aid while on clinical placement:

> *"I would have felt the awkwardness of taking out the book. Say you were doing an IM (injection) and looking at getting the stuff ready, it was awkward."* (Quote 40)

> *"It* [the RCCSC booklet] *was actually too big."* (Quote 44)

> *"It was really kind of bulky in your pocket. I felt, do you know, once you try and take it out, you're trying to pull it out*." (Quote 189)

Some of the students, therefore, perceived the RCCSC to be a little cumbersome to carry around in their pocket and it is possible that this may have had a negative effect on the number of self-recordings completed. This is discussed further in section 6.5 and should be considered in future designs.

The analysis confirms that the opportunity to practice clinical skills is important for the development of competency and that a practice based learning aid encourages students to seek appropriate learning opportunities. However it has

also identified that if the opportunity is not provided it can lead to a non-conducive learning environment, which is highlighted by the following quote from a student explaining why the RCCSC was not always completed, which was affirmed by the group:

> *"…just because, for me the opportunity didn't arise on the placement so it's as simple as that"* (Quote 103)

The quotations above demonstrate that what was emerging from the data was evidence that there were some factors beyond the students' control that were unconducive to their learning. These factors were directly related to the learning environment and include the lack of learning opportunity available, influenced by the nature of the clinical placement and the nursing care provided; the family members providing care; or the direct effect of a busy ward environment. Together, these environmental factors construct the first sub category of the third predominant theme, factors unconducive to learning.

The second sub-category to emerge was personal factors which relates to those factors influenced by the student's own personality or personal make up. These personal influences on how one learns are generally recognised in most learning theories and have to do with the individual's own personal philosophy and past experiences (Rutherford-Hemming, 2012).

Lack of confidence was identified by a number of students:

> "*Personally I feel we were only back here* [in the college after summer break] *one week and then straight on to placement and straight away I was lacking confidence. We'd the whole summer off and I just feel like, back for one week, had a few classes, the portfolio was the main thing we had to look at and em, I reckon that's why I lacked confidence anyway."* (Quote 234)

This student's perception was that prior to commencing clinical placement in the beginning of year two they were lacking confidence in performing clinical skills, and that the long summer break and short preparation were directly responsible. Other students also report the feeling of being unprepared prior to commencing their second year placement and identify the time lapse between theoretical and simulated learning and the commencement of clinical placement as being a causative factor:

> "*There was a big gap from doing the OSCE's and going into placement*." (Quote 237)

> "... *I felt that I didn't know them* [the steps] *because it had been nearly a year* [since learning the skill in the classroom] ..." (Quote 36)

> "*... we're able to do so little on these placements, the fact that we're so novice ...*" (Quote 49)

One student has identified that the actual gap since first their first simulated learning class could be almost a year, because of how the classes are spread out across the two semesters in year one. One student refers to herself as a 'novice', relating this to lack of ability, and another refers to her lack of knowledge regarding the procedural steps of the skills. This suggests that they were not fully prepared for their specialist placement. However, it has to be acknowledged that further practice and assessment by OSCE was provided at the end of the first year. The following quotations also highlight the feeling of being unprepared:

> "*You feel like you need a little refresher before you go on placement, for some of the skills anyway*." (Quote 69)

> "… *I just felt that in that week* [the first week in college after summer break and before going on placement] *we could have spent a couple of days maybe doing OSCE's* [skills training and assessment] *or whatever again, it might maybe just to refresh us again, you know?*" (Quote 73)

The students have identified that prior to commencing their clinical placement they believed that additional simulated learning or 'refreshing' their skills would be beneficial to their learning, and suggest a feeling of being unprepared for placement.

The final sub-category, interpersonal factors, relates to the factors that involve the relationship between the student and others around them, specifically the clinical staff responsible for the student when on clinical placement:

> "… *if a staff nurse asked you to give an IM (Intramuscular) injection you say 'yea, no bother' and you go and get your stuff ready and do it. You're not going to go 'yea, just give me time to read this* [the RCCSC]." (Quote 45)

> *"... they* [the RGN] *might get angry and go like 'Oh maybe they're not competent enough to give it'* [the injection] *you know, 'I shouldn't give it to them to do' so like you're going to want to go and do it straight away.*" (Quote 48)

The researcher sought clarity and confirmation of these opinions with the group as part of the member checking process. Their confirmation reflects the difficult interpersonal relationship between clinical staff and student, with the students expressing the feeling that they do not want to appear incompetent to the staff nurse. There is a belief that being seen referring to the RCCSC might make the staff nurse '*angry'* and could be interpreted as the student's lack of competence in completing a delegated skill. There is a suggestion that, rather than appearing to look incompetent by referring to the RCCSC booklet to remind themselves of the steps involved in the clinical skill, the student will try to perform the skill even if they do not feel entirely competent to do so. These examples demonstrate the difficult interpersonal relationship between staff and students. There is a perception among students' that the clinical staff are possibly not aware of the educational approach being implemented - specifically the use of a practice based learning aid and its purpose related to the transfer of learning from classroom to practice.

The students further commented on their perception of the RGN's expectation of the student's competence level prior to commencing their placement. For example the quotation below demonstrates one student's perception that

qualified staff nurses from clinical placement have a high expectation of their ability to perform clinical skills:

> "*I think they* [RGN's] *feel that you should be competent before you come to placement ...".* (Quote 55)

Others reported that sometimes the RGN was unsure of the student's ability and the students were keen to impress the staff with their ability to perform clinical skill competently:

> "*I found that my preceptor* [RGN responsible for student's learning while on clinical placement] *really didn't know what I could do. They really didn't know what expectations to have. They wanted to know what skills I did or didn't have*." (Quote 78)

These excerpts identify negative interpersonal factors between the student learner and the RGN, as perceived by the students in the focus group. It is clear that there is a lack of understanding and/or communication between the RGN, the student and faculty regarding the expected level of students' competence in clinical skills. Further discussion on enhancing understanding is provided in section 5.5. The interpersonal relationship between students and qualified staff appears to be based on a system of hierarchy, reflecting the findings of Ceraghi et al's (2012) study of Iranian nursing students, which identified the hierarchy between staff and student as a key causative factor in an unconducive learning environment. Although it could be argued that cultural factors may have influenced Ceraghi et al's (2012) findings, Houghton et al's (2012a) Irish study discussed in the literature review had similar findings.

Summary

This section presented the findings from the analysis of the focus group discussion as part of the qualitative strand of the study. The aim was to answer the research question by further exploring the responses provided in the evaluative post-test questionnaire and to gain further insight into participants' experiences of the educational approach and the use of the practice based learning aid. The mixed-methods approach used in this study requires the findings from the focus group to be considered with the other data generated, in order to gain a more holistic view of the student's experiences and the influence

of the practice based learning aid on their clinical skills competency. These results are, therefore, not designed to be considered in isolation. The findings were generated from an analysis of the focus group transcript (Appendix 13) and tables showing the coding process of how categories were extrapolated from the raw data are available in Appendix 16. The key themes identified from the analysis support the literature related to adult learning (Gatti-Petito et al, 2013; Knowles et al 2005) and identify motivation and self-concept as key prerequisites to learning. Furthermore, a number of other factors emerged relevant to learning, including factors that were either conducive or unconducive to the learning process. The findings also demonstrate how the practice based learning aid influenced competency development, providing the students with a means of identifying appropriate learning opportunities relevant to their skills requirements. In addition, the practice based learning aid acted as an *aide mémoire* for the steps required to perform a clinical skill; it promoted reflection and self-assessment; and ultimately led to embedded learning and the achievement of competence. The findings from the written reflective comments are presented in the next section, following which Chapter 6 will synthesise all the findings, that is, the combined quantitative and qualitative strands of the mixed-methods design.

5.2 Analysis of the Practice Based Learning Aid Reflective Comments

This section presents an analysis of the data generated from the students' written reflective comments in the RCCSC, collated during clinical placement. Key to the design of the RCCSC was the synthesis of the process of reflection along with a structured clinical skills checklist and a competency grading scale. The reflective component required the students to reflect on their performance following completion of each of the skills contained in the RCCSC. Detailed information on data collection and analysis is provided in sections 3.10 and 3.12.

This phase of the study relates to understanding the reflective processes utilised by undergraduate student nurses during clinical placement and also identifies some of the factors that help to develop and maintain their competency in clinical skills. Inferences are drawn from the reflective comments, with careful consideration being given to the context of the comments (Krippendorff, 2013). Two predominant themes, conducive learning factors and unconducive learning

factors, emerged from the content analysis and are directly comparable to key themes from the analysis of the focus group data.

5.2.1 Theme 1: Conducive learning factors

The first predominant theme arising from the reflective comments content analysis is conducive learning factors and it includes the sub categories of memory aid, self-assessment through reflection, repetition and embedded learning (Appendix 25, Figure 1).

In the key reflective comments made by the students there was evidence that the RCCSC provides a reference guide to the steps required for completing a clinical skill. The following excerpts provide an example of how many of the students refer directly to the RCCSC as an aid, to remind them of the necessary requirements prior to commencing the skill:

> "*Before this IM I had a chance to look over my assessment book* [RCCSC] *so I could ensure not to leave out any steps*" (Quote 102)

> " *…would read over the steps involved before commencing.*" (Quote 67)

There are numerous examples from the reflective comments where students report they would make reference to the RCCSC after having completed a skill and identify any steps that may have been omitted. Two examples are provided below:

> "*I forgot to check the expiry date.*" (Quote 43)

> "*I didn't pump with my elbow.*" (Quote 47)

These reflective comments were generally taken from the first or second recordings and highlight how, by reflecting on their performance, the students were able to identify steps they had omitted. The reflective comments demonstrate how the RCCSC acted as an *aide mémoire* by reinforcing the various steps the students required to perform the clinical skills competently. Two further sub-categories, repetition and embedded learning, help to demonstrate how the progression through the process of repeat performances and self-assessment leads to achieving competence.

Self-assessment through reflection also emerged from the reflective comments as one of the sub-categories of conducive learning factors. A number of the reflective comments made by the students demonstrated the reflective process in action. The following excerpt is an example from one student reviewing her performance on blood pressure recording:

> "*On my placement, I only did one manual blood pressure. On reflection, I should have tried to do more manual BP's on placement rather than electronic BP. I feel competent with electronic BP's. In my next placement I will do more manual BP's."* (Quote 99)

The example demonstrates how the student reflected on her performance, and includes a description of the situation, a description of her feelings, an evaluation and analysis of the situation and an identified conclusion and course of action for the next situation, suggesting the use of the phases in Gibbs' reflective cycle (1988). Other examples demonstrate directly how the students used the process of reflection to identify their level of competency:

> "*In reflecting on my hand washing performance, I realised that I forgot to remove my wrist watch.*" (Quote 26)

> *"On reflection I am very pleased with my performance.*" (Quote 84)

The examples demonstrate how the students were reflecting after their performance, known as reflection-on-action (Schön, 1987). The following two excerpts taken from a number of students' reflective comments help to highlight repetition as the third sub-category identified within the major theme of conducive learning factors:

> B/P 1: *"I didn't put the cuff so that the centre of the bladder was over the brachial artery and I pumped the cuff to 25 mmHg."* (PC)
>
> B/P 2: *"I didn't clean away the equipment straight away as I was called to do another task."* (C).
> B/P 3: *"I believe I did it correctly."* (FC)
>
> B/P 4: *"Gained complete confidence in this skill."* (FC)
>
> (Quotes 52-55).

The first example, from student RS6 (Appendix 17), provides the sequence of reflective comments from the four self-recordings in the clinical skill of monitoring

and recording blood pressure (B/P). The student reports a partially competent (PC) performance in the first recording and progresses to a fully competent (FC) performance in the fourth recording. Thinking about what they were doing and why they were doing turns the experience into meaningful learning. The student is demonstrating the process of reflection by looking back on their performance, taking time to consider their performance in light of the criteria provided in the RCCSC, and then learning from it by using the new knowledge for future situations.

The second example, from student RS18 (Appendix 17), reports the sequence of reflective comments from the self-recordings in the clinical skill of administering an intramuscular injection (IM).

> IM 1: "*I forgot to check the prescription sheet to ensure it* [the injection] *was not already given. In future I will ensure to do this and check expiry dates on all devices used*." (NC).
>
> IM 2: "*During this IM I failed to ensure patient dignity and introduce myself to the patient. In future I will communicate more with the patient."* (PC)
>
> IM 3*: "Before this IM I had a chance to look over my assessment book* [RSSCS] *so I could ensure not to leave out any steps."* (C)
>
> (Quotes 100-102)

Although quote 102 was used on its own to demonstrate reflection, it is used here in context to demonstrate the sequence of reflection. The student has progressed from a not competent (NC) performance in the first recording to a competent (C) in the third recording. Quotations 100 and 101, provided by the student, suggest that by using the RCCSC as a checklist to reflect on their performance they were able to identify steps that were not completed and therefore identify their level of competency, starting with a not competent performance and moving on to a partially competent one. Quotation 102 shows how the student was able to use the RCCSC as a memory aid to check the steps required for the IM injection and, in so doing, performed the skill competently. The examples above, therefore, demonstrate that over a period of time and by repeating the performance and reflecting, the students have progressed through various levels of competency beginning from either a Non Competent (NC) or Partially Competent (PC) performance in their first recording to being Competent (C) or Fully Competent

(FC) in their final recording. There are a number of further examples of this reported in the written reflective comments data in Appendix 17.

The final sub-category identified within the predominant theme of conducive learning factors was embedded learning which reflects the concept that the more contextual learning is to the job or task, the more an individual is motivated to learn (Littlejohn, 2006). Many of the reflective comments identify that after using the RCCSC the students obtained a Fully Competent level of performance in their clinical skills:

> *"I felt very confident doing this skill as I've had loads of practice. Did all the steps correctly.*" (Quote 63)

> *"I was happy with my performance. I feel comfortable with the steps because I have done them so many times."* (Quote 139).

> *"I feel I carried out the IM injection with competence and confidence."* (Quote 37)

> "*I feel I am fully competent in this skill.*" (Quote 81)

> "*I feel fully competent at hand washing as it is the most important aspect of nursing care. It is the most practiced skill.*" (Quote 125)

> *"I felt competent in this skill as I had practiced and looked over the steps previous to doing it.*" (Quote 07)

The excerpts above are taken from the written reflective comments in the submitted RCCSC booklets provided by a number of students. They mention doing '*the steps correctly'*, being '*comfortable with the steps*' and looking '*over the steps previous to doing it'*, which refers to using the RCCSC to check the steps identified for each skill and comparing their performance against the checklist provided. Quote 37, for example, was this student's third recording of IM injection and the key comment provided in the reflective component of the RCCSC shows that she now feels both competent and confident in her performance as she has progressed through the levels of competency from a competent to a fully competent performance (Appendix 17). Being happy with their performance and feeling both confident and competent links to internal motivation; these examples suggest that using the RCCSC as a guide to

performing a skill while in clinical practice motivates the students' learning and provides a framework for achieving a feeling of competency in that skill.

5.2.2 Theme 2: Unconducive learning factors

The next major theme Identified from the analysis of the reflective comments is unconducive learning factors (Appendix 25, Figure 2). This theme includes the sub-categories of environmental factors and personal factors, and the codes within each.

The reflective comments provided data concerning this theme; the following quote demonstrates why a student was unable to fully complete all the steps of the skill of administering a nebuliser:

> *"I did not inform the patient about the call bell as a relative (Mother) familiar with the nebuliser was present. I did not offer a face cloth as the patient's mother was present to help and the peak flow* [measurement of respiratory air flow] *was not indicated."* (Quote 15).

In the above example a relative provided some of the care for the patient; subsequently, the student graded her own competency level as partially competent because she did not complete all of the steps included in the RCCSC for this skill. This demonstrates that in a clinical learning environment where relatives are performing clinical skills, students can miss out on crucial learning opportunities necessary for competence development.

Other examples of unconducive learning factors include time constraints on a busy ward:

> *"Forgot to inform the patient how long the nebuliser solution would take as I was very busy."* (Quote 45)

> *"During this hand wash I left out a few steps. I felt rushed and didn't spend enough time on this procedure. In future I will ensure to include all the steps for an effective hand wash."* (Quote 96)

The examples above demonstrate how the RCCSC helped to identify students' perception of how the impact of a busy learning environment results in the non-completion all of the steps required for a competent performance of a clinical skill. A lack of equipment in the learning environment was also identified by some students as a contributory factor in not completing the skills competently:

> *"The water was not very hot. I didn't enquire if this was always the case."* (Quote 16)

> *"I did not clean the equipment beforehand because I could not find any cleaning equipment. On reflection, I realise that I should have asked a staff nurse."* (Quote 135)

Personal factors were identified as the second sub-category within the predominant theme of unconducive learning factors. By reflecting on their performance using the RCCSC some students identified problems related to poor communication:

> *"I was doing this B/P in the client's home while on public health placement and felt nervous. I forgot to tell the client about pressure on the arm."* (Quote 30)

> *"I feel I didn't explain the procedure to the patient effectively. I am now more aware of the importance of good communication."* (Quote 104)

The reflective comments demonstrate how the students have identified weaknesses in their own performance, thus acknowledging the importance of good communication as a key component when performing clinical skills. Through the use of a reflective cycle the students can develop an action plan to improve their skills. Communication was also affected by the delegation of tasks to students by the qualified staff:

> *"I did not introduce myself as I did the urinalysis in the sluice room for a staff nurse."* (Quote 13)

"*I didn't explain the procedure to the patient as I was just handed the* [urine] *sample to test."* (Quote 123)

In the above two excerpts, the urine sample was collected by the qualified staff member and handed to the students to perform the steps of the analysis. The possible learning opportunity of explaining the procedure to the patient and responding to the patient's anxieties or concerns has therefore been missed. At other times students reported that skills were not always completed because they have either been called away to assist or to complete another task by the qualified staff nurse:

"My preceptor signed the medication sheet as I was called away." (Quote 122)

"I got called away before I could finish it so my preceptor recorded the results." (Quote 124)

It can be seen therefore that through the process of reflection the students have identified both environmental and personal factors perceived to be non-conducive to learning in the clinical environment.

This section presented the findings from the analysis of the reflective component of the RCCSC, generated in the qualitative strand of the study. The aim of the analysis was to develop a deeper understanding of the experiences of the undergraduate student nurses during clinical placement and identify and some of the factors that help to develop and maintain competency in clinical skills. The findings help to answer the research question by demonstrating how the practice based learning aid implemented in the study encouraged students to reflect on their clinical skills and in doing so helped the students to identify both factors that were conducive to deep learning and those unconducive factors that limited internalisation of learning. The qualitative findings presented in Chapter 5 are discussed in Chapter 6 integrating the quantitative findings from Chapter 4.

Chapter 6: Discussion

Introduction

This chapter will discuss the implications of the findings that have been presented in Chapters 4 and 5 above. First, the main research findings related to the research question and the supplemental findings and their convergence and divergence with previous literature will be discussed. The limitations of the study are then reviewed and suggestions made for future research and dissemination.

6.1 Clinical skill competency level following simulated training

The main finding is the marked improvement in clinical skills competency among the student participants after completing the educational approach implemented in this study. Not only did students acquire an initial level of competency following theoretical and simulated teaching the finding from clinical placement show that they were able to retain, transfer and improve their clinical skills competency. The acquisition of clinical skills competency was determined by the use of the OSCE following completion of the theoretical and simulated teaching. The level of skills acquisition obtained in this study is consistent with previous studies including Ballard et al (2012), Hope et al (2011), Meechan et al (2011), Moule et al (2008), Rentschler et al (2007), Alinier et al (2006) and Morgan (2006) and supports the use of the educational approach used.

As with previous studies such as Handley and Dodge, (2013), McCaughey and Traynor (2010) and Moule et al (2008) simulation as a teaching modality was evaluated positively by the students. They also perceived that as a teaching method it had a positive influence on clinical skills competency development. There was a pass rate among the students of almost 90% and the high pass rate is similar to findings from other studies (Meechan et al, 2011; McCaughey and Traynor, 2010). This high pass rate however does not suggest that the students were fully competent in their performance of clinical skills. In fact in this study only 39.5% of the scores were in the fully competent range (Table 3). A ‘Partially Competent’ (PC) performance was an identified as an acceptable pass level for

the OSCE as long as the student did not achieve two or more 'ticks' in the 'Not Performed or Incompetent' box for any of the criteria identified for a skill. This is consistent with Benner's (1984) premise that beginning nursing students are at the level of a novice. Therefore even though students passed their OSCE with a partially competent grade it was recognised that they would still require continued supervision and further practice for competency transition.

The high pass rate was identified in the focus group as being a direct consequence of simulation training combined with the OSCE. The student participants felt confident and competent in their clinical skills following the OSCE. Both Meechan et al (2011) and Rentschler et al (2007) found that the students in their studies felt confident in their knowledge, interpersonal skills, and clinical skills following the OSCE and, in addition to scoring well in the OSCE, students from both studies considered the OSCE to be good preparation for their clinical experience. This discernment of competence is one of the sub-categories of the 'prerequisites for learning' theme identified above (Appendix 24, Figure 1). In addition to the positive evaluation of simulated teaching the students in the current study also evaluated the OSCE positively. This positive evaluation of the OSCE is consistent with studies from Ireland (Houghton et al, 2012a; Morgan, 2006) and from the UK (Handley and Dodge, 2013; Hope et al, 2013 McCaughey and Traynor, 2010). The positive evaluation adds to the previous argument (Gatti-Petito et al, 2013; Houghton et al, 2012a) supporting the Clinical Skills Laboratory (CSL) as an appropriate environment for teaching and assessing clinical skills competency.

6.2 Clinical skills competency level following summer vacation

The lack of empirical research determining the level of clinical skills retention among nursing students when in the practice setting was highlighted in Chapter 2. Most of the published research focused only on the retention of CPR knowledge and skills, including research by Oermann et al (2011), Settles et al (2011), Ackermann (2009) and Madden (2006). All of these studies reported some level of deterioration in these specific skills over time in the control groups; where a level of retention was reported, it was generally accredited to the intervention by the researchers (Oermann et al, 2011). In contrast, this study

found no significant deterioration in the students' competence scores in any of the six clinical skills over the three-month vacation period between the OSCE and the first RCCSC score recorded in clinical placement. Previous research by Bloomfield et al (2010) also reported that there was no deterioration in students' hand washing skills between the baseline and eight-week post-test measurement. However, Bloomfield et al (2010) reported a high attrition rate; unlike the current study, however, only the retention for the skill of hand-washing was examined and it is argued that as it is not as technically complex (Nicol et al, 2012) a higher level of retention may be expected.

What was interesting in this study was the fact that although there was no evidence of deterioration in clinical skills between the OSCE and the first recording from clinical placement, student perceptions from the evaluative questionnaire did not reflect this. Few studies have compared actual performance with perceived performance among undergraduate nursing students. For example, Meechan et al's (2011) study of first year nursing students reports a close correlation between actual and perceived levels of competence. The current study found that students' perceptions of their competence prior to beginning clinical placement after the summer vacation were lower than the actual competency level recorded at the beginning of clinical placement. Eleven out of the twenty six students (42%) perceived their overall skills prior to commencing clinical placement to be at the partially competent level (Table 17) and yet only 18.5% of the first recorded competency levels were in this partially competent range (Table 5) and is in direct contrast to the close correlation found by Meechan et al (2011). Furthermore, only three (11.5%) of the students perceived that they were fully competent prior to commencing placement (Table 17) and yet 38% of first clinical placement recording were in the Fully Competent range (FC) (Table 5). This lack of correlation between perceptions of competence and actual competence levels was also found by Gordon et al (2015) when examining nursing students' ability to accurately measure blood pressure. In this study the low perception of clinical skills competence prior to commencing placement was identified in the focus group analysis as one of the non-conducive learning factors. Students commented on how the long summer break and the gap between the OSCE and beginning of clinical placement had a negative effect

on their confidence and competence levels (5.1.3). Perception or discernment of competence are necessarily subjective measures (Levett-Jones et al, 2011) whereas the OSCE determines the formal level of competence attained in the simulated environment (Harden, 1988) and this study argues that the RCCSC provides objective evidence of clinical skills competency in the practice setting.

This study argues that the RCCSC provides a measurement of clinical skills competency as it is recorded in the reality of the practice setting rather than relying on subjective perceptions or self-measurements from the simulated environment such as those by Meechan et al (2011) and Morgan (2006). By reflecting on performance using the criteria-based checklist integrated in the RCCSC, the students in this study presented a more objective measurement of their actual clinical competence in practice. The findings of this study therefore add to the current discourse, recognising the dearth in the evidence base both nationally and internationally regarding standardised methods to determine nursing students' clinical skills competence and accuracy, especially in the clinical setting (Baillie and Curzio, 2009; O'Connor et al, 2009; Meechan et al, 2011; Gordon et al, 2015). The findings further add to the continued debate about how best to teach and assess these skills (Cowan et al, 2005; Levett-Jones et al, 2011; Yanhua and Watson, 2011; Cant et al, 2013).

Few studies have examined the retention of clinical skills among undergraduate nursing students other than CPR, for example Ballard et al (2012), Grierson et al (2012) and Bloomfield et al (2010). The lack of deterioration in clinical skills amongst the students in this study after a three-month period is therefore an important finding. It contributes to our understanding regarding the retention of knowledge and skills and support the applicability and utility of the practice based learning aid used in facilitating both retention and transfer of clinical skills competency.

6.3 Clinical skills competency and the practice based learning aid.

The findings from the study provide a strong argument for the practice based learning aid and show that the RCCSC had a positive influence on the participants' clinical skills competency levels. There is a dearth of published literature regarding the transfer of clinical skills competency from the simulated environment into the practice setting. As previously highlighted the published research generally focuses on the retention of CPR knowledge and skills, for example Ackerman (2009), Oermann et al (2011) and Settle et al (2011). Contrary to the findings of this study they generally report a decline in the competent performance of skills over time. A few studies (Grierson et al, 2012, Oermann et al, 2011) have reported an improvement in skills competence following an intervention. For example Grierson et al (2012) provided a video-based observational practice to improve nursing students' intramuscular injection technique whilst Oermann et al, (2011) provided a six-minute per month deliberate practice to the experimental group to maintain CPR skills. Both studies found that the experimental groups had improved from their baseline scores, and Oermann et al (2011) found a significant deterioration in the CPR skills of the control group during the same time scale.

This study also found a clear progressive improvement in the mean clinical skills competency levels. Competency levels were recorded at four points. The first were from the OSCE recorded in May. The second were the first recording at the beginning of clinical placement in September followed by the Max RCCSC score calculated from the student's best competency level recorded in clinical placement using the RCCSC. The final was the researcher's observed competency level recorded towards the completion of clinical placements. The improvement between the competency levels from the OSCE and the Max Competence Score was found to be statistically significant ($p<0.001$) (See Section 4.2.3) as was the improvement in competency levels between the OSCE and the researcher's recorded competency level ($p=0.04$) (Section 4.2.4). The improvement in the combined competency level recorded at the beginning of clinical when compared to the maximum competency level recorded in clinical placement and with the competency level recorded by the researcher towards the end of the clinical placement was found to be statistically significant (Section 4.2.3 and Section 4.2.4). Previous studies have also reported an improvement in

competency levels and these were attributed directly to the additional learning intervention provided (Oermann et al, 2011; Ballard et al, 2012; Grierson, 2012). For example, Ballard et al (2012) reported a significant improvement in the accuracy and technique of students' blood pressure recording skills following an additional hour of simulated training. The students in Oermann et al's (2011) study were required to attend the CSL for six minutes each month to practice their CPR skills. In this study however, students were not required to leave clinical practice to attend additional training. As a practice based learning aid the RCCSC was designed to be used in clinical practice. The significant improvement in the retention and transfer of clinical skills competency among the student participants suggests that rather than providing a costly intervention such as additional training in the CSL (Oermann et al, 2011; Ballard et al, 2012; Grierson, 2012), the use of a practice based learning aid as part of an integrated educational approach provide a catalyst for encouraging students to engage in a form of deliberate practice while on clinical placement and has a direct influence on clinical skills competency.

Evidence taken from the students' reflective comments helps to support the argument that the RCCSC promotes a progressive development of competence. The example below from section 5.2.1 is one student's reflective comments, progressing from her first assessment for the skill of measuring blood pressure until her fourth assessment:

> B/P 1: *"I didn't put the cuff so that the centre of the bladder was over the brachial artery and I pumped the cuff to 25 mmHg."* (PC)
>
> B/P 2: *"I didn't clean away the equipment straight away as I was called to do another task."* (C).
>
> B/P 3: *"I believe I did it correctly."* (FC)
>
> B/P 4: *"Gained complete confidence in this skill."* (FC)

It is argued that the RCCSC, through the synthesis of reflection with the criterion-based clinical skills checklist and competence self-grading scale, has enabled the student to identify the errors made in her earlier performances. The underlying theory of constructivism (Vygotsky, 1978) that underpinned the learning approach used enabled the students to learn from their reflective experiences and, by

progressing from a partially competent (PC) performance in the first assessment to a fully competent (FC) performance in the fourth assessment, embedded the necessary knowledge, skills and attitudes required for competent practice of the identified skills. The behaviourist view is that simple repetition of the skill will improve performance (Merriman and Caffarella, 1999); however this study argues that the RCCSC promotes the form of deliberate practice identified by Ericsson et al (1993) which requires attention, rehearsal and repetition, leading to new knowledge or skills that can then be developed into more complex knowledge and skills.

Students perceptions from the evaluative questionnaire suggest that the educational approach implemented in this study, specifically the use of a practice based learning aid had a direct influence on the improvement in competency levels. Supporting the findings of Meechan et al (2011) and Morgan (2006) the students also perceived their competency level to be much higher after completing clinical placement when compared to commencing placement.

The process of self-assessment has previously been found to result in a perceived improvement in both confidence and competence among students (Hawkins et al, 2012; Baxter and Norman, 2011; Meechan et al, 2011; Yoo et al, 2010; Watts et al, 2009). The RCCSC used in this study has therefore had a positive impact on students' competence levels in clinical skills which, as highlighted in the literature review, constitute knowledge, skills and attitude. Significantly, the Max score was also found to be the final self-assessed competence score for most of the skills (Table 10), confirming the progressive nature of the improvement in student participants' competent performance.

Findings from the focus group add further support to the objective measurement of improved skills performance and the positive evaluations from the post-test questionnaire. The findings indicate that the RCCSC played a key role in the learning process. The quotes below are taken from the focus group findings (5.2.1) evaluating the RCCSC. Within the theme of Conducive Learning, the findings highlight the fact that the RCCSC had a direct effect on competence development:

> "*Yea, like once you looked at them* [the steps] *you kinda know what they are then, it's kinda imprinted anyway, and you perform it …"*
>
> "*The steps do sink in*."

These examples indicate that students believed that using the RCCSC resulted in embedded learning (Littlejohn, 2006), where the components of the clinical skills became '*imprinted*' and the procedural steps '*sink in'*. The students also reported feeling competent and confident in their performance of clinical skills after completing the self-assessments in the RCCSC. This links directly to Chesser-Smyth and Long's (2013) study that reported a direct correlation between self-confidence and competence among undergraduate nursing students. It was found that as confidence developed, motivation, a key component for competence (Valloze, 2009), towards academic achievement simultaneously increased. Conversely, self-confidence was quickly eroded by poor preceptor attitudes, lack of communication, and the feeling of being undervalued. Lack of self-confidence was also identified in this study as a key factor that was non-conducive to student's learning (5.1.2 and 5.1.3) and the latter findings from Chesser-Smyth and Long (2013) are substantiated by the findings from this study where the attitudes of the preceptor were identified by the students as influencing their learning in clinical practice.

Predominantly though, the RCCSC as a practice based learning aid has increased perceived confidence and competency levels among the students and reflects the findings from previous research where other forms of learning intervention were used (Oermann et al, 2011; Ballard et al, 2012; Grierson, 2012). The evidence that clinical skills competency levels improved and that the procedural steps of the skills have sunk in indicate that the students have encoded the information or steps of the skill to be stored in their long term memory, ready for future retrieval when required; this is a cognitive process which Surgenor (2010), referred to as the final stage in cognitive information processing theory.

Examination of the results from the observed performance in clinical placement (4.2.4) found a statistically significant difference between the students' and researchers recorded competency levels ($p=0.039$). The students in this study tended to under-estimate their competency level for the observed performance

when compared to the researcher recorded level. This is a conclusion similar to that of Lundquist et al's (2013) study, where it was found that the students' self-assessment of their skills was consistently lower than that of faculty staff. Watts et al (2009), on the other hand, found that first year nursing students had a tendency to overrate their performance of wound dressing technique when compared with faculty staff, and Baxter and Norman's (2011) study of nursing students found no evidence of a positive association between self-assessment and observed performance. Indeed, the accuracy of self-assessment methods used in healthcare has previously been questioned. Colthart et al (2008), for example, in their review of the literature could find no research studies that provided a solid evidence base for effective self-assessment, and a previous review by Eva and Regehr (2005) also concluded that there was little evidence for effective self-assessment. In this study, however, the students' self-assessed competency levels, where the researcher was present, was significantly lower when compared with the students' Max competency level recorded in clinical placement, where the researcher was not present ($p=0.016$). The presence of the researcher during the students' grading of their own performance while on clinical placement, therefore, appears to have had a direct negative effect on the self-graded competency level. This finding suggests that students' tendency to under-assess their performance was possibly due to the Hawthorne effect (Sarantakos, 2005), whereby the awareness of being observed brings about a change of behaviour.

There was no statistical significance however between the students' self-recorded Max competency level and the researcher's observed competency level recorded at the end of clinical placement; in fact both competency levels were fairly similar (Table 15). Additionally, 94% of the Max competency levels recorded were also the final self-graded competency levels recorded in the RCCSC (Table 10), and further analysis calculated the sample size to be large enough to provide a 94% probability that if there was any significance present, it would have been detected. The close correlation between the students' final self-graded clinical skills competency level with the clinical skills competency level recorded by the researcher at the end of clinical placement suggests that there is a level of reliability in the RCCSC. This finding is in direct contrast to those of Watts et al

(2009), Baxter and Norman (2011) and Lundquist et al (2013), and implies that for this study the students' self-grading of clinical skills competency using the RCCSC was a reliable indicator of their actual clinical skills competency level. Furthermore, the lack of significant difference between the two scores indicates that the RCCSC acted as an intrinsic motivator (Knowles, 1984). Once the maximum competency level was achieved the students' level of clinical skills competence was maintained in clinical placement.

The findings from this study discussed so far contend that the educational approach and particularly the practice based learning aid, influenced the retention, improvement and transfer of clinical skills competency among undergraduate nursing students in practice. Within the context of clinical skills there was a clear transition in competency levels as described by Benner (1984) from novice through advanced beginner and even to the level of competent practitioner among the student participants. It is difficult to make a direct comparison of the results from this study as, *a priori* no other studies have been carried out addressing the transfer and retention of clinical skills for undergraduate nurses using a specific educational approach that integrates a practice based learning aid. The literature review identified that the majority of studies analysed the retention of CPR knowledge and skills and, in fact, cited a deterioration of these skills (Madden, 2005; Ackerman, 2009; Oermann et al, 2011; Settle et al, 2011). It could be argued that due to the nature of CPR, practitioners rarely have the opportunity to implement the skill in the real practice setting which can contribute to deterioration (Yang et al, 2012). Learning opportunity was identified as a key sub-category within the theme of Conducive Learning factors from both the focus group (5.1.2) and reflective comments analysis (5.2.1). The students in this study recognised the importance of having the learning opportunity to practice clinical skills and support previous findings that the opportunity for learning is essential for a clinical environment that is conducive to learning (Muldowney and McKee, 2011; Newton et al, 2010). Furthermore the students in this study recognised lack of learning opportunity as one of the factors responsible for a non-conducive learning environment, thus supporting previous findings from Ceraghi et al (2008). The current study therefore highlights the importance of exposing students to opportunities to

practice skills while on clinical placement and the effect of this exposure on the students' perception of competence and confidence.

6.4 The Reflective Process

The evaluative questionnaire (Appendix 7) (4.3.2) found that 98% of the students believed that RCCSC helped them to reflect on their practice, a key component of learning (Schon, 1987). Further support is provided by both the focus group (5.1) and the written key reflective comments (5.2). Both sets of findings provide evidence to indicate that the retention, improvement and transfer of learning previously identified was in part due to the use of the RCCSC as a guide for reflecting on practice. The use of a reflective guide has previously been shown to enhance the reflective abilities of both nursing and paramedic students (Jones and Alinier, 2009), when a Reflective Simulation Framework (RSF) was implemented to guide and enhance reflection both during and after simulation activity. In their study, Jones and Alinier (2009) used a reflective framework as an *aide mémoire* to trigger and focus the reflective process which was designed to be used in simulated learning activities. They found that the students indicated that they might use such a framework in clinical practice and identified the 'step by step guide' and 'written reflection' elements as key benefits to the framework (Jones and Alinier, 2009). The RCCSC designed and examined in this study is unique in that it synthesises the elements of reflection along with a criteria-based clinical skills checklist and a competence grading scale. More importantly, the RCCSC was specifically designed to be used in the practice setting. Student participants in this study made reference to reflecting on their clinical skills performance using the RCCSC to identify any of the procedural steps they might have omitted.

The example below is taken from the focus group (5.1.2), which identified reflection as a sub-category within the identified theme of conducive learning factors:

> *"… I looked at the book* [RCCSC] *after to see if I'd gone through the whole process correctly.*" (Quote 53).

The student is acknowledging that they have '*looked through'* the RCCSC to ensure they have completed all the steps. It could be argued that the student is just using the checklist for direct feedback on performance but further analysis

from this section identifies students directly referring to the RCCSC as helping them to '*reflect*'. By reviewing their practice after the event the students have reflected on what happened, what was done and whether there was anything they would change the next time in relation to the outcome. This process resonates what Schön (1987) refers to as reflection-on-action, used to transform experience into knowledge. Further examples from the students' written reflections using the RCCSC demonstrate the reflective process-in-action (5.2).

Findings from the focus group (5.1.2) also confirm that students assessed their competence as they were performing the actual skill. This demonstrates reflection-in-action, which links directly to Schön's (1987) theory of professional practice. It has previously been argued that demonstrating reflection-in-action is a distinguishing feature of the expert practitioner, who has the ability to experiment and think about their practice while they are engaging in it (Nelson, 2012; Benner, 1984, Dreyfus and Dreyfus, 1980; McCelland 1973). The evidence from this study indicates that the RCCSC acts a catalyst for post-reflection. The process of thinking about what they were doing and why they were doing it is what turns the student's experiences into meaningful learning (Dumchin, 2010). Using the RCCSC encouraged the students to look back on their clinical skills performance, take time to consider the competence criteria for the skill, then learn from that experience and use the new knowledge to help in future similar situations, referred to as the cyclical nature of reflection (Gibbs, 1988). This study therefore supports the argument that learning through reflection is more effective if there is an understanding of frameworks that encourage a structural process to guide the act of reflection (Jones and Alinier, 2009).

The students in this study were entering the second year of their undergraduate nursing programme and as such were considered as novice learners (Benner, 1984) who predominantly reflected-on-action (Patterson and Chapman, 2013). However, it is argued that the continued use of the RCCSC in the long term would allow the student to reflect in action based on their post-reflection. The focus group found that students talked about assessing their performance while doing it (reflection-in-action). Both the data that identified the RCCSC as a motivator for students to seek learning experiences, and the positive evaluations of how the

RCCSC made them think about the performance criteria for each skill, suggest that post-reflection would result in students thinking about the performance criteria when next faced with a situation; they are therefore engaging in reflection-in-action (Schön,1987).

The findings also confirm the RCCSC acted as a learning tool for enabling them to identify issues that may have impacted on their performance. The predominant learning themes of Conducive Learning Factors and Unconducive Learning Factors (Appendix 24, Figures 2 & 3) emerged from analysis and interpretation of the focus group transcript. The transcript of the written key reflective comments from the RCCSC (Appendix 17) provides evidence of the students engaging in the key stages of evaluation and analysis in Gibbs' (1988) reflective cycle. Through this reflective process the students were enabled to develop an action plan for future learning opportunities to perform clinical skills, thus completing the reflective cycle. The conceptual framework underpinning the design of the RCCSC (Figure 1) identifies constructivism as a key learning theory (Vygotsky, 1978) and the students were actively constructing and building on their own knowledge base through reflection. The qualitative and quantitative findings of the study also support Kolb's (1984) thinking on how reflection on experience promotes the integration of theory into practice. This study advances the findings of previous research, such as that of Jones and Alinier (2009), by designing and implementing a reflective tool to be used in the practice setting. There was a strong recommendation from the students that the RCCSC should be developed further to include additional skills and be implemented across the undergraduate curriculum. The findings help to bridge the gap in the literature previously identified regarding how nursing students transfer learning from the simulated environment to the practice setting; as such it helps to bridge the theory-practice gap for undergraduate nursing students.

Other findings from the focus group revealed that the students referred to the RCCSC to remind them of the '*steps*' involved in performing clinical skills. They also demonstrated the perception that the RCCSC helped them to recall the performance criteria required when performing clinical skills competently. The ability to recall information that had previously been learned forms part of the concept of long term memory retrieval (Miller, 2011; Atkinson and Shiffrin, 1968),

which is recognised as a key concept in cognitive information processing theory and learning development (Surgenor, 2010). By acting additionally as an *aide mémoire*, the RCCSC was conducive to the students' learning in clinical practice.

The majority of the students in this study found the RCCSC easy to use. Nonetheless there were some comments from the focus group that suggested it was '*bulky*' (5.1.3) and a more compact version should be considered for future development. The evaluative questionnaire (4.3) also found that 34% of the students were unsure when asked if they believed the RCCSC helped them in gaining a greater understanding of the patient's experience relating to Blooms (1956) affective domain. This may either be due to students not fully understanding the question, or to there being a greater focus in the RCCSC on the cognitive and psychomotor domains of the skill rather than the affective; this should be considered in future development.

Studies that have used other types of interventions to improve clinical skills competence and retention include the use of video feedback (Grierson et al, 2012), deliberate practice (Oermann et al, 2011), comparison of instructional methods (Settle et al, 2011; Ballard et al, 2010 and Ackerman, 2009) and computer assisted learning (Bloomfield et al, 2010; Day et al, 2009). However, these interventions either took place during initial training in the CSL or required participants to return to the CSL for additional education. Other studies including those conducted by Handley and Dodge (2013) and Hope et al (2011) provided additional simulated learning activities in the CSL and found that such measures have major implications for funding. Ballard et al (2012) also found that it stretches resources in relation to both personnel ratios and equipment. Furthermore, some studies reported problems with attrition rates (Settle et al, 2011; Bloomfield et al, 2010) and identified difficulties with accessing staff relief for attendance (Ackerman, 2009). In the current study the RCCSC was designed as an intervention tool that that afforded the student the opportunity to use an integrated, flexible and user friendly learning aid that could be applied in a clinical context, as and when required with minimal financial or resource implications.

Based on the main finding from this research a conceptual framework for theory practice integration for clinical skills competency was developed (Figure 19).

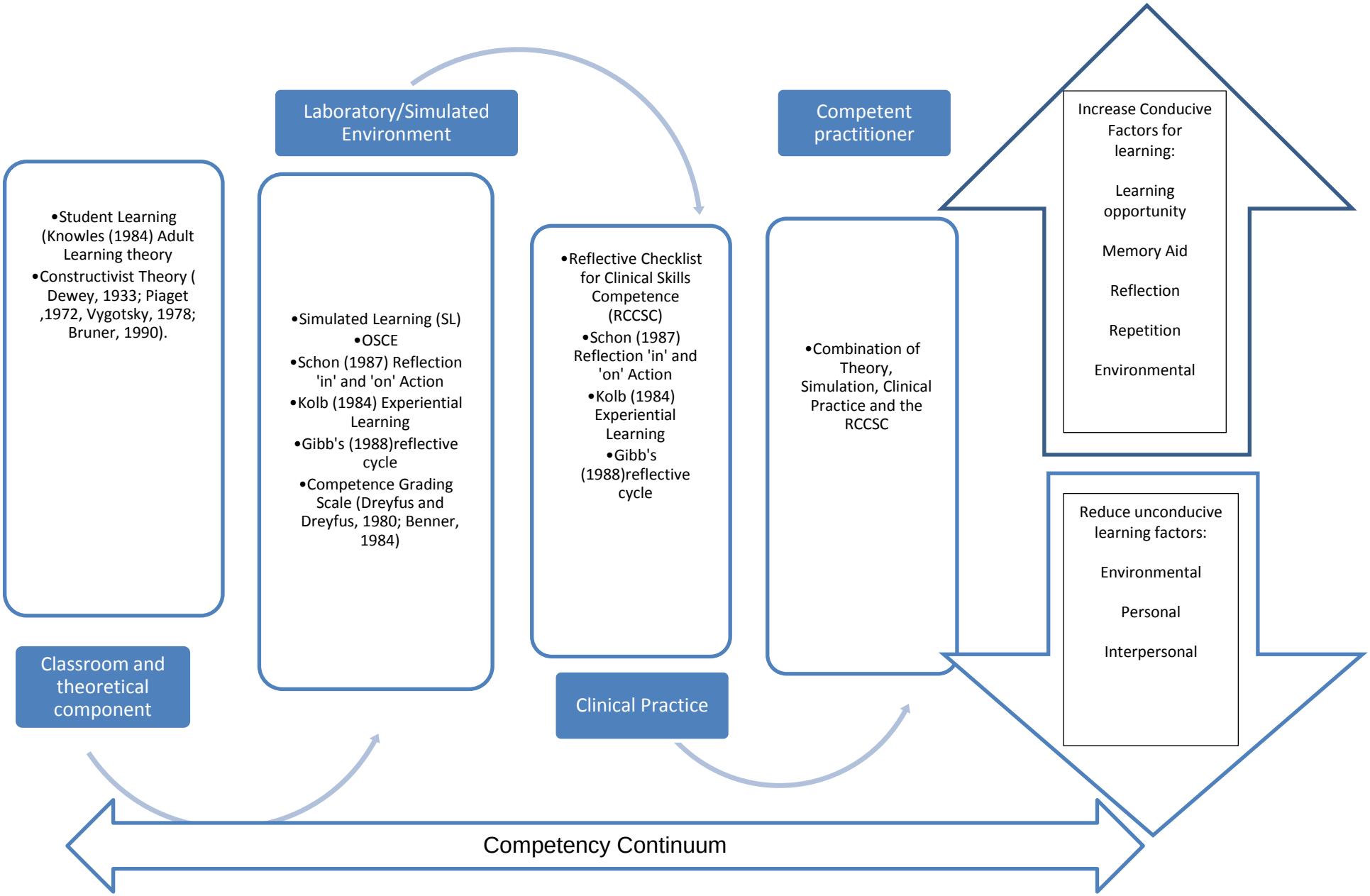

Figure 19: Tentative Model of Competency Transition

Figure 19 provides a diagrammatic representation of the tentative model of competency transition drawn from the findings of the study. The original conceptual framework for this study is discussed in section 3.2 and informed the educational approach to competency development and transition implemented in the study. Pre-requisites for learning are established and teaching begins in the classroom setting where theoretical underpinning of clinical skills and competency is provided using teaching methodologies underpinned by adult learning theory (Knowles, 1984) and social constructivist theory (Vygotsky, 1983). Simulated training follows in the clinical skills laboratory (CSL) incorporating learning through reflection (Schon, 1987; Gibbs, 1988), experiential learning (Kolb, 1984), competency development (Dreyfus and Dreyfus, 1980; Benner, 1984) and the use of OSCE (Harden and Gleeson, 1979). These elements are then further developed in the clinical practice setting using the RCCSC as a practice based learning aid to augment the transfer of learning from theory to practice. When implementing the educational approach used in this study one must take cognisance of the factors that are conducive to learning and endeavour to reduce the factors identified as unconducive to learning. The combination of these elements leads to the development of the competent practitioner.

6.5 Limitations of the Study

Prior to listing the limitations, it is important to note that one of the strengths in this study was the use of an explanatory-sequential mixed-methods design, which Creswell and Plano Clark (2011) argue to be most useful when the researcher wants to assess trends and relationships with quantitative data, but also be able to explain the mechanism or reasons behind the resultant trends. However, the use of such a design in an educational setting meant that an area of possible concern in this study is sample size. The sample (n=27) used in this study cannot be considered representative of the population of interest because of the available sampling technique used. However, Heppner et al (1992, p. 274) refer to the '*good enough principle*' by which non-random samples can have sufficient characteristics such that generalisation to certain populations is reasonable. In this study generalisation (external validity factor) was not one of the primary goals of this research, however the inclusion of a mixed-methods approach in

educational research allowed for a more flexible approach to both the design of the study and to the interpretation and transferability of the results (Cresswell and Plano Clark, 2011).

The limited sample size had an impact on the procedures needed to show statistically significant differences between the clinical skills competence scores recorded at different intervals. However a *post hoc* power analysis using G*Power3 statistical analysis was carried out to establish whether or not the non-significant findings had a fair chance of rejecting an incorrect null hypothesis (Faul et al, 2007) for the quantitative strand; the results were over and above the considered appropriate statistical power value of 0.69 set for this study (Gravetter and Wallnau, 2000).

In order to ensure sufficient quantitative and qualitative data for analysis the limited sample size ruled out the selection of a quasi-experimental design. A single cohort pre-test post-test design was therefore used within the quantitative strand of the explanatory-sequential design phase of the study. Not having comparative data from a control group may have influenced the interpretation of the effect of the RCCSC on the participants' competence and subsequently limits causal inferences (Gerrish and Lacey, 2010). It is further acknowledged that, regardless of the fact that the researcher had withdrawn from lecturing duties with the cohort participating in the study, the author's dual role as researcher and lecturer on the BSc in Nursing programme may have influenced students within the focus group to respond in a socially desirable fashion. Social desirability bias is also a consideration when interpreting the results from the five-point Likert Scale used in the self-designed questionnaire (Appendix 7). Furthermore, the questionnaire had not been empirically tested apart from the pilot testing within this study.

Internal validity factors that were given consideration were the degree to which the practice based learning aid influenced the improvement in competency levels rather than uncontrolled extraneous factors. During the period of a research study internal threats occur due to real changes in the environment of participants (Saks and Allsop, 2007). Given that this study was conducted in an educational and

practice setting, it would be expected that, as participants progress through a four-year degree programme and are exposed to different teaching and learning strategies and to different experiences both in their professional and in their private life, this should have an impact on their learning and development. Other influences on learning include maturational changes, which are natural biological and psychological changes that happen as part of lifespan development (Rosenthal and Rosnow, 2008). However, at the outset many characteristics were controlled by using selection criteria as outlined in Chapter 3. Participants' prior experience or motivation could not be controlled for in this research and may well be considered a limitation. Attrition rates for completion of the RCCSC in practice also need to be acknowledged. Not all of the students completed all of the skills using the RCCSC in clinical practice, yet it was evaluated positively in the questionnaire by all the participants. Due to assurances provided regarding anonymity, it is not known why this is the case. However, the evaluative question was based on the students' perception of using the tool and evidence from the reflective comments and from the focus group indicated that some students identified that they used the practice based learning aid as a reflective guide but did not necessarily complete the written checklist due to various constraints in the workplace. This should therefore be considered in future research and development of the educational approach used.

The question of the efficacy of the competence grading synthesised with Gibbs' reflective cycle (1988), was the catalyst to the success of this research. Given the possible limitations identified, using a mixed-methods approach is frequently the only satisfactory way to proceed in researching applied educational research on aspects of formal learning and teaching processes in third level education, and assessing how such approaches affect learning achievement.

6.6 Dissemination

In pursuing scholarship in academic settings, educators endeavour to disseminate both their work and research in the public domain. This not only involves subjecting research findings to critical examination but equally it involves an exchange of ideas with other colleagues (Shulman, 2000). As educators have to keep constantly abreast of trends in education, engage in personal dialogue

and respond to criticisms about teaching and student learning in the public domain, it is imperative that they are seen to engage in educational research (Lyons, 1998). Shulman (1998, p. 12) highlights this point:

> *Having to take our teaching from the private to the public sphere, having to think about how we are going to engage in it, but also how we will come to understand what we are doing as educators in ways that will permit us to organize what we do, display and communicate and converse about it to our own community, will have an improvement effect on teaching.*

Disseminating the results of this study is one way of increasing educators' awareness of the effectiveness of the educational approach implemented in this study. This work was initially presented to the student participants as a measure on 'member checking' (Patton, 2002). The key findings were presented followed by an open discussion on the results from the quantitative data and the themes identified from the qualitative data. The key finding on how the practice based learning aid influenced clinical skills competency development was well accepted by the participants. Some were a little unsure regarding the thematic analysis of the written reflective comments and the focus group. This required further explanation of the methods used and of the researcher's interpretation. However, following this discussion there was a general agreement to the emerging themes and tentative competency model providing some measure of authenticity to the findings (Ritchie and Lewis, 2003). The findings have also been presented to colleagues with the same professional area of practice and the educational approach has subsequently been implemented for the current undergraduate general nursing degree programme. The practice based learning aid has been further developed to include additional clinical skills and has been adapted for application to undergraduate psychiatric and intellectual disability nursing students. Preliminary work has also begun with the Virtual Learning Department at Waterford Institute of Technology to consider the development of an electronic version for students to access online. The work has also been presented at both national and international nursing education conferences and a paper is currently being prepared to submit to professional peer-reviewed journals for publication (Appendix 26). The dissemination process at research fora has led to the researcher being asked to disseminate the results of the research at the

University of Maribor in September 2015. The Faculty of Health Sciences at the University of Maribor has sought permission to use RCCSC as part of their educational and research programme. Future dissemination will involve presentation to the Udine C group (Understanding Developmental Issues for Nurse Educators Careers), which involves eight EU countries who endeavour advance academic and professional education in nursing within the European Union and beyond.

Chapter 7: Conclusion

At the outset, this research sought to answer the research question 'Does a practice based learning aid influence theory practice integration for clinical skills competence among undergraduate nursing students'? The resultant findings have shown that an educational strategy combining simulation-based training with a practice based learning aid did have a positive influence on undergraduate nursing students' development of competency, retention and transfer of clinical skills to the practice setting. There was a marked improvement in overall competency grades at the end of clinical placement when compared to competency grades prior to and at the beginning of clinical placement. This improvement was attributed directly by the students to the experience of using the practice based learning aid in clinical practice. It helped promote reflective practice, encouraging students to learn from their experience by identifying errors and omissions and reactivate and enhance prior learning. Students evaluated the practice based learning aid as a key influence on the integration of learned theory from the classroom to the clinical practice setting and this chapter discusses and explores the wider contribution of these findings to theory, education, curriculum design and future research.

7.1 Theoretical implications

An important contribution of this study is that it extends the body of knowledge in relation to the use of theoretical and simulation-based training, together with a practice based learning aid in undergraduate nursing practice. The literature review identified a lack of empirical research on how student nurses transfer competency-based learning into their clinical practice. This study, therefore, extends the current literature and theoretical conceptualisations of using theory and simulation as a learning strategy for clinical skills competence. It also shows how and educational approach integrating a practice based learning aid can bridge the theory-practice gap. The results of the observations in this study have theoretical implications for the understanding of the concept of reflection within constructivist learning theory. The educational approach incorporating a practice based learning aid promotes the reflective practice ideologies of Schön (1987)

and, although the majority of students were reflecting-on-action, there was some evidence of students engaging in reflection-in-action as they developed their expertise (5.2.1). It is argued that, through its application, the educational approach will extend the theory of reflection, informing learning environments with theoretical principles that allow individual learners to utilise a reflective checklist to identify performance deficits in relation to clinical skills and eradicate these for future performance. For example, the theoretical and empirical literature to date has not considered the effectiveness of synthesising a model of reflection with a competency-based self-assessment and clinical skills checklist in a third level undergraduate nursing education programme. Therefore, this synthesis is an important contribution to knowledge, as it extends the knowledge base regarding application of reflective frameworks in third level education and our understanding of competence development and conceptualisation of reflection as a *modus operandi* within formal learning.

7.2 Implications for education

Until this point the theoretical and empirical literature has failed to consider how, educationally, students can bridge the theory-practice gap in undergraduate nursing education incorporating a practice based learning aid that synthesises a competency grading scale, skills checklist and a process of reflection, as a learning modality for undergraduate nursing students in the practice setting. The educational approach implemented in this study and particularly the practice based learning aid is a contribution to our understanding of how students transfer learning from the classroom to clinical practice. The educational implication of using the practice based learning aid provides diverse opportunities for learners because the fundamental principle underlying this theory is that individuals bring many abilities to the learning environment. This is in keeping with constructivist theory that supports learning activities that build on previously learned material and promotes activities that are reflective, self-critiquing, and self-directed (Rutherford-Hemming, 2012). Therefore, this study broadens the field of educational theory in learning and teaching approaches using simulation as a teaching strategy integrated with the practice based learning aid in clinical practice, but with reflective theory as its grounding philosophy.

The findings generated by this study do not pretend to be absolute, but can be viewed as a contribution to the field of understanding clinical skills acquisition, competency development and the transfer of learning to the clinical environment as supported in the literature review. Consequently, the findings may provide an important contribution to future constructivist approaches to skills teaching and learning, which educators can modify or adopt in third level education. The internal benefits for third level education are the provision of innovative approaches that strive to promote excellence in teaching and learning in third level educational programmes. The external benefits would be to facilitate other institutions to engage proactively in educational change using the integrated approach of simulated training practices and the RCCSC. Other modules and fields of learning could assimilate and integrate the RCCSC, thereby engaging a wider range of learning approaches in third level education.

7.3 Implications for curriculum design

The findings of this study have significant implications for undergraduate curriculum design. Taken as a whole, the findings of this study indicate that curricula in undergraduate nursing should incorporate a clinical module that integrates theoretical and simulated teaching activities in the Clinical Skills Laboratory (CSL) with the RCCSC as a practice based learning aid. The results echo and support the conclusions of other investigators discussed in the literature review (Patterson and Chapman, 2013; De Swardt et al, 2012; Jones and Alinier, 2009) that the integration of reflective models and processes in curriculum designs and instructional strategies provide many benefits for promoting student achievement, engagement and deep learning.

The findings of this study imply that delivering a theoretical and simulated skills module in nursing curricula, incorporating the RCCSC, can have a positive effect on learning and achievement. They support the contention that the integration of a reflective framework within nursing curricula has utility and applicability as an educational intervention method. Certainly, further research is required to test the RCCSC and explore how different learners interact and navigate different

curriculum content using such a practice based learning aid thereby determining its influences on student learning and achievement in the clinical environment. This research has attempted to present a conceptual model that could be replicated by educators in comparable third level educational settings.

Significant implications for the provision of nursing education programmes also arise from this research. In the literature review (Chapter 2) it was seen that Brosnan et al (2006) and Cowan et al (2005) expressed concern about nursing undergraduates' clinical competence levels. Concern has also been continually expressed over the last decade regarding the acquisition and retention of clinical knowledge and skills (Cant et al, 2013; Garside and Nhemachena, 2013; Houghton et al, 2012a; Meechan et al, 2011). Given the concern expressed in the literature this study has implications regarding the benefits of the educational approach for students in undergraduate nursing programmes. Furthermore, although the practice based learning aid is designed as a practice based learning aid rather than as a formal assessment tool, collaboration between faculty and clinical staff would be a key component for ensuring that an effective interpersonal relationship between staff and student promoted both understanding and implementation of the practice based learning aid in clinical placement.

7.4 Implications for future research

The results of this study demonstrate that theoretical and simulated learning, integrated with a practice based learning aid, has implications for future research. The implication is that undergraduate nurses can benefit from both theoretical and simulated learning and in using the practice based learning aid in the nursing practice setting. As, *a priori*, no research has been carried out in this area, a follow-up study with similar respondents is recommended, to identify if the approach to clinical skills learning has similar results in relation to the retention and transfer of clinical skills learning and competency to the clinical environment, consequently reinforcing the findings in this study. It is hoped that a further study will be carried out in the coming years and that this type of predictive validity will

show whether there is an association between the approach used and skills retention in practice.

The explanatory-sequential mixed-methods design used in this study allowed for the synthesis of the qualitative and quantitative findings in helping to answer the research question and meet the aims and objectives of the study. By doing so, this research contributes to the current discourse on research methodology and has methodological implications that can strengthen future research in this important area of nursing education.

There is a requirement to carry out more research on the development of standardised educational approaches to skills teaching in nursing. Further studies are warranted that use qualitative approaches, using a phenomenological design, to establish participants' subjective experiences of using a reflective framework in clinical practice and its perceived effect on competency development. It would also enable educators to understand the development and processes involved in implementing new learning and teaching approaches from both the educator's and students' perspective.

Based on the preceding discussion of the results several conclusions were drawn from this study. First, the results of this study support the prediction stated in Chapter 1: that is, that a practice based learning aid integrated with theoretical and simulated training, can improve the retention and transfer of clinical skills competency to the clinical practice setting. More specifically the educational approach used provides educators with a methodology to enable students to transfer clinical skills teaching from the simulated setting to clinical practice.

The study provides empirical support for the theorised conception that synthesising competency grading with a performance criteria checklist, along with the process of reflection, results in increased clinical competency skills for undergraduate nursing students. While this conclusion is tentative due to the exploratory nature of the study, the sound theory-informed methodology and the reliability and validity of the results allow for the assertion that the methodology and the RCCSC is an effective approach that can be used for undergraduate

nursing students in practice. Furthermore, this study supports the literature in relation to the use of the OSCE in a simulated environment and further provides support for the efficacy of the simulated setting for teaching clinical skills. The acquisition and retention of knowledge and skills is recognised as a problem not only for those involved in nursing education, but also for other healthcare professionals including doctors (Kahol et al, 2010), physiotherapists (Johnson et al, 2013), dietetic students (Pender and De Looy, 2004) and radiographers (Jackson, 2007) There is an increasing awareness of the use of reflection and reflective frameworks within these professional groups as an aid to professional learning. The integrated approach designed for this study, could be adopted or modified to meet the needs of these groups and supplement current teaching and learning strategies.

In their professional journey from novice to expert, students learn from their experience and reflection is integral to the process of knowing. The standard of proficiency in clinical skills among new nursing graduates continues to be deliberated on in the professional literature, therefore the implementation of teaching and learning strategies that promote competency remains a challenge for nurse educators.

The multi-dimensional design of the practice based learning aid incorporates the cognitive, affective and psychomotor elements of clinical skills and, in line with the constructivist approach to learning, provides students with a learner-centred framework which can be used flexibly to aid reflection in and on practice, keep a record of their learning experiences, and help them develop competence and confidence in their clinical skills. The RCCSC can be used to promote written reflection, can be kept in a pocket and can be used as an *aide mémoire* or quick reference guide to trigger and focus the reflective process. In conjunction with the educational approach used the practice based learning aid provides nursing students with a means to transform their experiences into knowledge through reflection in order to enhance learning and practice.

The approach taken to this study adds to the discourse on mixed-methods designs. The two strands to this study were necessary to gain a deeper understanding of the research problem. The practice based learning aid allowed

for the sequential collection of both quantitative and qualitative data used to answer the research question and meet the research aims and objectives. In particular this design allowed for the generation and analysis of different, but complementary data to allow the best understanding of the research problem and to lend insight into the learning processes involved in developing competence in clinical skills. The research is an attempt to clarify the current state of clinical skills teaching and the transfer of clinical skills competency to the nursing practice area. It validates the utility and applicability of the approach and the practice based learning aid as a reflective framework; based on the study results, it is one means of achieving effective individualised skills education in nursing.

Lastly, building on the previous points, it is concluded that this study provides additional theoretical and research-based knowledge in the fields of nursing, education, practice and research. Prior to this research no attempt has been made to address the important area of the transfer of clinical skills to practice for undergraduate nurses. This study has potential for future theoretical research and applied uses in the healthcare environment.

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Appendices

Appendix 1: Table listing in alphabetical order the key studies included in the literature review, including title, author, participants, methodology, key findings and conclusions.

Authors	Participants	Title	Method	Key Results/findings	Conclusions
Ackermann, A. (2009).	Nursing students	Investigation of learning outcomes for the acquisition and retention of CPR knowledge and skills learned with the use of high-fidelity simulation	Quasi-experimental	The Human Patient Simulation cardiopulmonary arrest scenario provided to the experimental group had a statistically significant effect on the acquisition of both CPR knowledge (p=0.002) and skills (p=0.0001). Although there was a deterioration in both groups, the 3-month retention scores for the experimental group were significantly higher than for the control group.	This information may assist health care educators to teach CPR with improved learning outcomes
Alinier, G., Hunt, B., Gordon, R. and Harwood, C. (2006)	Nursing students	Effectiveness of intermediate-fidelity simulation training technology in undergraduate nursing education	Quasi-experimental	93% of students and 95% of staff found the OSCE to be beneficial and that it should be part of the curriculum and 86% of students believed it helped develop their confidence.	OSCE provides an integrated way of measuring learning outcomes in skill based learning. It help students to determine their weaknesses and enables faculty to realise the current students' abilities.
Ballard, G., Piper, S. and Stokes, P. (2012).	Nursing students	Effect of simulated learning on blood pressure measurement skills	Quasi-experimental	One hour of additional teaching and simulated learning showed a statistically significant improvement in the experimental group of nursing students ability to measure blood pressure accurately when compared with the control group (t=2.760, P=0.017, df=12, CI=95%),	In a changing practice environment with fewer opportunities to develop clinical skills under supervision, there is a need for nurse educators and mentors to reconsider and research further methods used for blood pressure monitoring and other skills teaching using simulation for effective learning and skills acquisition.
Baxter, P. and Norman, G. (2011).		Self-assessment or self-deception? A lack of association between nursing students' self-assessment and performance	Randomised Control Trial (RCT)	The experience of dealing with the simulated crisis situations significantly increased perceived confidence and perceived competence in dealing with emergency situations (p=0.0001), although it did not affect self-perceived ability to communicate or collaborate. All but 1 of the 16 correlations between self-assessment and the objective structured clinical examination total scores were negative. Their self-assessment was also unrelated to several indices of experience in critical care settings.	Self-assessment in nursing education to evaluate clinical competence and confidence requires serious reconsideration as our well-intentioned emphasis on this commonly used practice may be less than effective
Bloomfield, J., Roberts, J. and While, A. (2010).	Nursing students	The effect of computer-assisted learning versus conventional teaching methods on the acquisition and retention of hand washing theory and skills in pre-qualification nursing	RTC	Knowledge scores increased significantly from baseline in both groups and no significant differences were detected between the scores of the two groups. Skill performance scores were similar in both groups at the 2-week follow-up with significant differences emerging at the 8-week follow-up in favour of the intervention group, however this finding must be interpreted with caution in light of sample size and attrition rates.	The computer-assisted learning module was an effective strategy for teaching both the theory and practice of handwashing to nursing students and in this study was found to be at least as effective as conventional face-to-face teaching methods.

		students: A randomised controlled trial.			
Brosnan, M., Evans, W., Brosnan, E. and Brown, G.(2006).	Nursing students and lecturers	Implementing Objective Structured Clinical Skills Evaluation (OSCE) in nurse registration programmes in a centre in Ireland; a utilisation focused evaluation	Mixed methods	The OSCE process was found to have a positive impact on all stakeholders. OSCEs were perceived to be a meaningful and fair form of assessment. Students identified that they felt more prepared for and more confident about forthcoming placements. The OSCE process was, however, perceived to be a stressful experience and requires considerable preparation effort by students and academic staff. Mature students claimed that more practice effort was required but also felt more prepared for placements and achieved higher OSCE scores	The OSCE process is an educationally sound method of formative assessment of clinical skills for student nurses. The educational benefits of this approach outweigh its financial and opportunity costs. Other nurse educators should consider the OSCE approach as a potentially useful method of assessing nursing skills within nurse educational programmes
Byrne, E. and Smyth, S. (2008).	Nurse lecturers	Lecturers' experiences and perspectives of using an objective structured clinical examination (OSCE)	Interpretative phenomenology	The data for this study was collected using two focus groups in one institution in the Republic of Ireland. Two main themes emerged: OSCE preparation and assessment process	The use of OSCEs throughout the undergraduate nursing programme is recommended. All students should be assessed performing the same skill mix during one examination period. Students' familiarity with the marking criteria in advance of the OSCE was viewed in a positive light. Nurse educators should be involved in teaching and assessing the skills. In particular, participants maintained that the anxiety students' experience in an examination situation may benefit students' overall performance in clinical settings
Calman, L. (2006).	Patients	Patients' views of nurses' competence	Grounded theory	The study utilised a grounded theory approach (n=27). Data were analysed, in keeping with the grounded theory tradition, utilising the constant comparative method. Patients described the foundation of competent nursing practice as technical care and nursing knowledge. Patients assume that technical care is competent as safe guards are considered to be in place to protect patients. When technical competence is assumed, interpersonal attributes become the most important indicator of the quality of nursing care.	The results of this study highlight uncertainty about whether patients feel able to assess the competence of nurses. The results of this study may have implications for nurses internationally when trying to involve patients in the assessment of nurses
Chesser-Smyth, P. and Long T. (2013).	1st year nursing students	Understanding the influences on self confidence among first year undergraduate nursing students in Ireland	Mixed methods	There was considerable variation in the amount and nature of theoretical preparation. Factors in clinical practice exerted the most influence. Self-confidence fluctuated during the first clinical placement and as students' self-confidence developed, simultaneously, motivation towards academic achievement increased. Conversely, self-confidence was quickly eroded by poor preceptor attitudes, lack of communication, and feeling undervalued.	Conclusion. The development of self-confidence is complex and multi-factorial. This study offers further understanding of facilitators and barriers that may be relevant elsewhere in promoting student nurses' developing self-confidence. The development of self-confidence must be recognised
De Swardt, H., Du Toit, H. and Botha, A. (2012).	Critical care nursing students	Guided reflection as a tool to deal with the theory-practice gap in critical care	Interpretive phenomenology	Themes that emerged from the data included a description of incidents experienced, critical analysis of knowledge, critical analysis of feelings and changed perspective experienced. Theory–practice integration occurred to an	Guided reflection ought to be incorporated in the education of nurses from their basic training in theory and practice so that student nurses will be aware of their own competencies in order to provide optimal

		nursing students		extent in some of the categories; conversely, the inability to apply theory to practice evoked responses such as feelings of guilt and incompetence. Guided reflection appeared to have assisted the participants in clarifying theoretical and practical experiences, and in reaching a changed perspective by understanding the link between theory and practice.	patient care.
Grealish, L. and Ranse, K. (2009).	Nursing students	An exploratory study of first year nursing students' learning in the clinical workplace	Qualitative	Forty-nine written student narrative accounts of a learning experience were analysed and three triggers for learning were identified. The first trigger is that participation (or observation) of a task or procedure leads students into a complex, dramatic reading of nursing work. The second is that when students are personally (emotionally) confronted by the work, it presents a high challenge situation, recognized by students as a significant learning opportunity. The third trigger is encounters with different nurses assist students to construct an image of what they want to be as a nurse.	These three triggers appear to align with Wenger's Communities of Practice constructs for identity, engagement, imagination, and alignment, and provides preliminary evidence supportive of the social theory of learning for nursing students on clinical placement
Grierson, L., Barry, M., Kapralos, B., Carnahan, H., and Dubrowski, A. (2012).	Nursing students	The role of collaborative interactivity in the observational practice of clinical skills	Quasi-experimental	The pre-test–post-test analyses revealed significant interactions (global rating scale: $F(2,22) = 4.00$ [$p = 0.033$]; checklist: $F(2,22) = 4.31$ [$p = 0.026$]), which indicated that post-test performance in the ESPO group (a group that observed the expert demonstration, self-assessed and contrasted their assessments with those of an expert, and formed a community that engaged in peer-to-peer feedback) was significantly better than pre-test performance. The transfer analyses revealed main effects for both the global rating scale ($F(2,23) = 6.73$; $p = 0.005$) and validated checklist ($F(2,23) = 7.04$; $p = 0.004$) measures. Participants in the ESPO group performed better on the transfer test than those in the EO group (a group that observed the expert demonstration)	The results suggest that video-based observational practice can be effective in extending simulation-based learning, but its effectiveness is mediated by the amount of time the learner spends engaged in the practice and the type of learning activities the learner performs in the observational practice environment. We speculate that increasing collaborative interactivity supports observational learning by increasing the extent to which the educational environment can accommodate learners' specific needs
Handley, R. and Dodge, N. (2013).	Nursing students and educators	Can simulated practice learning improve clinical competence	Mixed methods	This paper details the findings of a scoping exercise undertaken to ascertain current simulation practice within nursing curricula, in order to identify good practices and a clear evidence-base for embedding and using simulation to enhance education and practice. The project found overwhelming support for simulated learning from students and facilitators. However, it was highlighted that no clear guidance or strategies were universally used to effectively incorporate simulation within curricula, nor to evaluate or audit its effect upon student competency within clinical practice.	Further evidence to support the implementation of simulation within nurse education is therefore required to ensure effective implementation and transferability of learning into clinical care settings.
Hawkins, S., Osborne, A., Schofield, S., Pournaras, D. and Chester, J. (2012).	Medical students	Improving the accuracy of self-assessment of practical clinical skills using video feedback –The importance of including	Quasi-experimental	A total of 31 final year medical students participated. Student self-assessment scores before video feedback demonstrated moderate positive correlation with expert assessor scores ($r = 0.48$, $p < 0.01$) with no change after video feedback ($r = 0.49$, $p < 0.01$). After video feedback with benchmark performance demonstration, self-	The demonstration of a video-recorded benchmark performance in combination with video feedback may significantly improve the accuracy of students' self-assessments.

		benchmarks		assessment scores demonstrated a very strong positive correlation with expert scores ($r = 0.83$, $p < 0.0001$).	
Hong, L. and Chew, L. (2008).	Nursing students	Reflective Practice from the Perspectives of the BSC Nursing Students at the International Medical University,	Mixed methods	Students viewed reflective practice as a form of learning that provided them with an opportunity to express themselves, keep a record of their learning experiences for reflection after duty, and in the process helped them improve in the clinical area. Motivation factors included feedback and guidance from their preceptors and group discussions. Factors that inhibited the reflective practice included not being sure of what to include in the reflective journals, language, time constraints and personal attitude.	Sessions should be planned to introduce reflection, reflective practice and journaling to the students in the first semester before starting clinical placement. Workshops on reflective practice and its underlying skills should be provided to academic staff and clinical preceptors. Protected time should be provided during clinical placement for students to write their reflective journals.
Hope, A., Garside, J. and Prescott, S. (2013).	Nursing students	Rethinking theory and practice: Pre-registration student nurses experiences of simulation teaching and learning in the acquisition of clinical skills in preparation for practice	Mixed methods	The study features a thematic analysis of evaluation questionnaires from pre-registration student nurses (n=500) collected over a 2 year period which informed subsequent focus group interviews to explore the themes in more detail. Consistent data findings were the students' positive response to simulation as a learning approach facilitating the application of theory in a safe controlled environment. Students reported that they felt prepared for practice, recognising that simulated learning improved their humanistic and problem solving abilities as well as the development of psychomotor, technical skills, and overall confidence.	The theory practice gap is a recurring narrative in the nursing literature, the findings of this study recognises that simulation offers an opportunity to enact the integration of theory and practice illuminating this relationship in a controlled environment thus, reinforcing the theory-practice relationship for nursing students.
Houghton, C., Casey, D., Shaw, D. and Murphy, K. (2012a).	Nursing students, lecturers and clinical staff	Staff and students' perceptions and experiences of teaching and assessment in Clinical Skills Laboratories: Interview findings from a multiple case study	Qualitative multiple case study	The Clinical Skills Laboratory can provide a pathway to practice and its authenticity is significant. Teaching strategies need to incorporate communication as well as psychomotor skills. Including audio-visual recording into assessment strategies is beneficial. Effective relationships between education institutions and clinical settings are needed to enhance the transferability of the skills learned.	The Clinical Skills Laboratory should provide an authentic learning environment, with the appropriate use of teaching strategies. It is crucial that effective links between educators and clinical staff are established and maintained.
Jones, I. and Alinier, G.(2009).	Nursing and paramedic students	Introduction of a new reflective framework to enhance students' simulation learning: a preliminary evaluation	Survey	The data collected indicated that the majority of students are in favour of using the framework for addressing a variety of learning needs, including knowledge development, reflective assignments, and more particularly for feedback and review of the simulation experience and clinical practice issues. The aspects of the framework less favourably scored related to the embedding of reflective learning and planning future actions.	Findings suggest that some students use the framework more for their immediate practical needs rather than for the intermediate planning and longer term applications of reflective practice such as synthesis of learning. That is not to say that students do not think about those aspects of the reflective process and further in-depth studies are strongly recommended for exploring these results in more details.
Lejonqvist, G., Eriksson, K. and Meretoja, R. (2012).	Nursing students,	Evidence of clinical competence by	Cross-sectional qualitative	The aim of the study was to explore the forms and expressions of clinical competence in simulated situations	The results of this study show that simulation offers safe training of skills, problem solving, critical

	lecturers and clinical staff	simulation, a hermeneutical observational study	research	and furthermore to explore if and how clinical competence could be developed by simulation. An observational hermeneutic study with a hypothetic-deductive approach was used in 18 simulated situations with 39 bachelor degree nursing students. In the situations, the scenarios, the actors and the plots were described. The story told was “the way from suffering to health” in which three main plots emerged. The first was, doing as performing and knowing, which took the shape of knowing what to do, acting responsibly, using evidence and equipment, appearing confident and feeling comfortable, and sharing work and information with others. The second was, being as encountering the patient, which took the shape of being there for him/her and confirming by listening and answering. The third plot was becoming as maturing and developing which took the shape of learning in co-operation with other students. All the deductive categories, shapes and expressions appeared as dialectic patterns having their negative counterparts.	thinking, decision making, communication, and group- and teamwork, which are well in line with earlier research. The study showed that simulation learning is a good way to demonstrate and develop all aspects of a clinical competence and that the challenge lies in truly encountering the patient. Simulation is a valuable complement to other forms of learning. To succeed in this, students need to come to the simulations prepared, and they need to study by themselves. In simulations, students can show a wide range of knowledge, skills and competence.
Lundquist, L. Shogbon, A., Momary, K. and Rogers, H. (2013).	Pharmacy students	A Comparison of Students’ Self-Assessments With Faculty Evaluations of Their Communication Skills,	Mixed methods	Four hundred one (97.3%) students consented to participate in this study. Faculty evaluation scores of students for both the individual and group oral assessments were significantly higher than students’ self-assessment scores. Students’ self-assessment scores of their communication skills increased from the individual to the group oral assessment.	Conclusion. Students’ self-assessments of communication skills were consistently lower than faculty members’ evaluations. Greater use of oral assessments throughout the pharmacy curriculum may help to improve students’ confidence in and self-assessment of their communication skills
Madden, C. (2006).	Nursing students	Undergraduate nursing students’ acquisition and retention of CPR knowledge and skills,	Mixed methods	The findings showed an acquisition in nurses’ CPR knowledge and psychomotor performance following a 4 h CPR training programme. Despite this, at no point in this study, did any nurse pass the CPR skills assessment. A deterioration in both CPR knowledge and skills was found 10 weeks following CPR training. However, students’ knowledge and skills were improved over their pre-training scores, which clearly indicated a positive retention in CPR cognitive knowledge and psychomotor skills.	The study findings present strong evidence to support the critical role of CPR training in ensuring that nursing students progress to competent and confident responders in the event of a cardiac related emergency.
McCaughey, C. and Traynor, M. (2010).	Nursing students	The role of simulation in nurse education	Survey design	Quantitative data was collected through use of Likert scales, whilst a comment box permitted the compilation of qualitative remarks. A 60% (n= 93) response rate was achieved. Findings indicate that simulation using high fidelity simulators is perceived to be a valuable method of learning, which should positively impact on the clinical effectiveness of nursing students approaching the transition to registered nurses. Furthermore participants believed that their experience with high fidelity simulators enhanced the safety of their practice.	This study has strengthened the case for using high fidelity simulators as a means of assisting linkage of theory to practice. Whilst there are limitations to the realism of high fidelity simulators, the majority of subjects considered simulation an authentic learning experience. New knowledge from this research suggests that high fidelity simulators may contribute significantly to the preparation for nursing students' final key stage management assessment prior to entry to the Nursing and Midwifery Council (NMC) register. Although engagement with the high fidelity simulators can be anxiety provoking, this may precede perceived augmentation of learning, skill and confidence.
Meechan, R., Jones, H. and Valler-Jones, T. (2011).	Nursing students	Students’ perspectives on their	Survey design	Students identified that the curriculum supported the acquisition of clinical skills, and clinical examination results	Students’ responses to items that related to perceived confidence and competence levels were positive.

		skills acquisition and confidence,		confirmed that 95% of students were competent to pass their OSCE.	This indicates that the introduction of clinical skills teaching and assessment within a university's simulation suites augmented with structured assessment within the clinical environment improved the acquisition of clinical skills.
Morgan, R. (2006).	Nursing students	Using clinical skills laboratories to promote theory–practice integration during first practice placement: an Irish perspective	Heideggarian approach	The participants identified that sessions taught in the clinical skills laboratory before the first practice placement, which they identified as 'basic nursing skills such as taking and recording vital signs and hygiene needs of patients were useful and helped them to integrate theory to practice during their first practice placement. These results identify the use of teaching sessions in the clinical skills laboratories, enabling students to link theory to practice during practice placements.	Nursing students must be adequately prepared to carry out clinical skills competently and efficiently. Educators and practitioners must display the knowledge and skills required to promote theory–practice integration, to enhance nursing students education, which in turn will optimize high standards of patient care. Clinical skills laboratories are essential to help students develop the collaborative skills required for a profession like nursing. It is essential that students are adequately prepared to carry out clinical skills during their first practice placement, and have the ability to link theory to practice.
Moule, P., Wilford, A., Sales, R. and Lockyer, L. (2008).	Nursing students and clinical staff	Student experiences and mentor views of the use of simulation for learning,	Mixed methods	This paper presents the findings of a two phase mixed methods study. Phase 1 included a sample of 69 adult and children's pre-registration students from years one and three of their programme, studying at one UK University. The group attended five simulation sessions including basic life support, manual handling, infection control, clinical decision making and managing violence and aggression. Students completed pre- and post-tests in basic life support and manual handling, and vignettes and objective structured clinical examinations (OSCEs) covering the five areas of simulation. Phase 2 included interviews with six mentors who were supervising students involved in the study. Simulation was positively received by both students and mentors as it was apparent that it offered scope for interdisciplinary learning that could be broadened to inter-professional applications	Simulation can support the development of knowledge and skills in a range of clinical practice scenarios, offering opportunities for skill rehearsal, feedback and testing prior to consolidation in practice. It can offer a range of learning opportunities not always available in practice and afford students the opportunity to develop confidence through practice. The development of simulation may offer opportunities for collaborative working between higher education providers and clinical staff, though the practicalities and resourcing of this need exploration
Nevin, M., Neil, F. and Mulkerrins, J. (2014)	Nursing students N=87	Preparing the nursing student for internship in a pre-registration nursing program: Developing a problem based approach with the use of high fidelity simulation equipment,	Evaluative questionnaire (15 closed, 3 open ended).	A simulated learning support package was developed by nurse educators and piloted with 134 third year nursing students. This was evaluated using a questionnaire in which 87 students responded. Students generally found the simulation sessions realistic and useful in developing clinical skills, knowledge and confidence for clinical practice. However student issues regarding support with preparation for the session were highlighted. Also, the need for a more formalised structure for debriefing following the simulation sessions were identified.	Provides nurse educators with some guidance to aid future development of innovative and interactive teaching and learning strategies.
Oermann,M., Kardong-Edgren, S., Odom-Maryon, T., Hallmark, B., Hurd, D., Rogers, N., Haus, C., Keegan-McColgan, J., Snelson, C., Wilson-Dowdy,	Nursing students	Deliberate Practice of Motor Skills in Nursing education: CPR as an exemplar	RTC	The study explored the effects of deliberate practice on the retention of cardiopulmonary resuscitation (CPR) psychomotor skills among nursing students. The practice sessions were short, six minutes a session one time a month. Differences in performance between students who had deliberate practice and a control group, with no practice	There is a need in nursing education for deliberate practice of relevant and high-use skills for students to improve their performance and gradually develop their expertise.

S., Resurreccion, L., Kuerschner, D., Lamar, J., Nelson-Tennant, M. and Smart, D. (2011).				beyond the initial training, were compared every three months for one year. The intervention group performed better than the control over the 12 months.	
Rentschler, D., Eaton, J., Cappiello, J., McNally, S. and McWilliam, P. (2007).	Nursing students	Evaluation of undergraduate students using Objective Structured Clinical Evaluation,	Mixed methods	A total of 49 students were assessed on three of six patient simulation stations and one of two non-patient stationary stations. Students found the case studies to be realistic and the post-encounter questions challenging yet applicable. The majority reported they felt confident in their knowledge, interpersonal skills, and clinical skills and that they considered the OSCE good preparation for their final clinical experience. The faculty, students, and standardized patients found the OSCE to be a worthwhile experience.	The OSCE is considered valuable and worthy of further development. Recommendations include, assessing senior students prior to their final clinical course, training for Simulated Patients should be refined with specific focus on constructive feedback, and additional case studies should be developed to include more diversity in patient age and ethnicity.
Settles, J., Jeffries, P., Smith, T. and Meyers, J.(2011).	Medical and nursing students	Advanced Cardiac Life Support Instruction: Do We Know Tomorrow What We Know Today?	Pre-test-post-test design	The two methods of teaching and evaluating competencies for ACLS were (1) traditional classroom instruction plus practice and evaluation with monitors (low-fidelity simulation); and (2) classroom instruction plus practice with high-fidelity patient simulators. Participants in the study were 148 health care professionals or health care students who were novices in ACLS preparation. The findings showed no significant differences in ACLS knowledge, skills, self-efficacy, or learner satisfaction immediately after instruction or at 3 to 9 months post-training. Retention of ACLS knowledge and skills competency over time was low in both groups.	These findings indicate the need to further investigate this area and develop new instructional interventions and guidelines for practice and remediation to reinforce ACLS knowledge and skills. In addition, policies need to be reviewed for the 2-year certification requirement and what instruction or updates may be required between recertification dates.
Wellard, S. and Heggen, K. (2010).	Nursing students	Are laboratories useful fiction? A comparison of Norwegian and Australian undergraduate nursing skills laboratories	Mixed methods	The findings from both countries are compared and, in spite of distinct differences in the level of financial investment, there are striking similarities between the ways in which laboratories are used in the two countries. The laboratories were designed to predominately represent acute care hospital environments. The participants demonstrated a high level of commitment and strongly held beliefs in the laboratory as a safe place to facilitate self-paced learning and as an environment where students can practice until they become competent and confident. However, at the same time, there was a striking lack of evidence to support these views. The participants in both countries reported a common approach to instruction: a process of teacher demonstration, followed by student repetition and practice. Variability in students' motivation also was reported and the participants especially expressed concern for those students with a low level of interest in the basic skills associated with personal care.	There is a need to review the role that laboratories can play in the development of students for entry into practice There is a need for research on how to link teaching and learning in the lecture theatres with skill laboratories and clinical sites. The transfer of knowledge between these three areas needs to be researched. There is a lack of knowledge about how students can benefit from gaining knowledge as they move between these three different areas for preparation to become nurses
Yoo, M., Yoo, Y. and Lee, H. (2010).	Nursing students	Nursing Students' Self-Evaluation Using a Video Recording of Foley Catheterization: Effects on Students' Competence,	Pre-test-post-test design	The students in the experimental group (n = 20) evaluated their Foley catheterization performance by reviewing the video recordings of their own performance, whereas students in the control group (n = 20) received written evaluation guidelines only. The results showed that the students in the experimental group had better scores on competency ($p < 0.001$), communication skills ($p < 0.001$),	Overall competency in nursing skills can be improved when students can actively participate in the learning process by having an opportunity to review and reflect on their performance. The study also shows that simple and inexpensive video devices may be used in training clinical skills for nursing students.

		Communication Skills, and Learning Motivation,		and learning motivation (p = 0.018) than the control group at the post-test, which was conducted 8 weeks after the pre-test. Self-awareness of one's own performance developed by reviewing a videotape appears to increase the competency of clinical skills in nursing students.	

Colour Key: Quantitative Studies  Qualitative Studies  Mixed Method Studies 

Appendix 2: Table showing Benner's five levels of competence

(Adapted from Benner, 1984, pp. 13-34)

Competence Level	Level Descriptor
Level 1: Novice	Beginners, because they have no experience with the situations in which they are expected to perform, must depend on rules to guide their actions. Following rules however has its limits. No rule can tell novices which tasks are most relevant in real life situations. The novice will usually ask to be shown or told what to do.
Level 2: Advanced Beginner	An advanced beginner is one who has coped with enough real situations to note (or to have them pointed out by a mentor) the recurrent meaningful aspects of situations. An advanced beginner needs help setting priorities since she/he operates on general guidelines and is only beginning to perceive recurrent meaningful patterns. The advanced beginner cannot reliably sort out what is most important in complex situations and will need help to prioritise.
Level 3: Competent	Typically, the competent professional has been in practice two or three years. This person can rely on long-range goals and plans to determine which aspects of a situation are important and which can be ignored. The competent professional lacks the speed and flexibility of someone who has reached the proficient level, but competence is characterised by a feeling of mastery and the ability to cope with and manage contingencies of practice.
Level 4: Proficient	This is someone who perceives a situation as a whole rather than in terms of parts. With holistic understanding, decision-making is less laboured since the professional has a perspective on which of the many attributes and aspects present are the important ones. The proficient performer considers fewer options and hones in on the accurate region of the problem.
Level 5: Expert	The expert professional is one who no longer relies on an analytical principle (rule, guideline, maxim) to connect an understanding of the situation to an appropriate action. With an extensive background of experience the expert has an intuitive grasp of the situation and focuses in on the accurate region of the problem without wasteful consideration of a larger range of unfruitful possibilities.

Appendix 3: Informed Consent form

Date:

Dear Student,

The Nursing Department in Waterford Institute of Technology is undertaking a research project, with the aim of developing a clinical skills self-assessment tool for nursing students. You are being invited to participate in this research project.

The development of skilled clinical practitioners is an essential component within any nurse education programme. Evidence suggests that theory is not always applied in practice causing what is commonly termed the 'theory-practice gap'. By developing and testing a self-assessment tool for clinical skills, it is hoped that the research project will go some way to narrowing this 'gap'. Your participation in the project will therefore be essential to its success.

There are three stages to project and your participation will include involvement in each of these:

The first stage will be during the OSCE assessments for Praxis 2 and 3 modules at the end of semester 2. This will involve you completing a self-assessment of your performance in the OSCE and consenting to your DVD recording being viewed by the researcher, to ensure reliability with the examiners assessment of your performance. It should take no more than 5 mins to complete the self-assessment sheet for each skill.

The second stage will take place during your Year 2 (Semester 3) clinical placement. During this placement, you will be required to complete a Reflective Checklist for Clinical Skills Competence (RCCSC) a learning tool purposively developed for this study. This entails reflecting on your performance on six clinical skills using the checklist and competence performance criteria provided. During the placement you are required to complete up to four self-assessments in the RCCSC for each of the six skills. On completion of the RCCSC, the researcher will arrive unannounced to your clinical placement and you will be required to perform two clinical skills included in the RCCSC. The researcher will assess your performance using the same assessment criteria as that included in the OSCE and the RCCSC. You will also be asked to complete a self-assessment of your performance. This stage of the study should take between 30-mins to 1 hr to complete.

The third stage will take place during Year 2 (Semester 4) on your return to college from clinical practice. Your RCCSC booklet will be returned for analysis, including the written reflective comments provided. You will also be asked to complete a questionnaire evaluating your experience of using the RCCSC in

clinical practice and may be asked to participate in a focus group, lasting no more than 1 hr, to discuss and evaluate your experiences of the assessment process. All data collected will be completely confidential and participants will remain anonymous and will not be used for any purpose other than this study and subsequent publications. Participating in the study will have no impact on your course work or academic progress. There are no anticipated risks of any harm or discomforts to you if you choose to participate in this research study and you are free to withdraw at any time during the project

A briefing session will be arranged for those students willing to participate in the project to outline the self-assessment process and how to complete the RCCSC. Any questions or concerns can be raised at this time. Information will be provided as to the confidential nature of all data being collected, how it will be stored, destroyed and you will be reassured that anonymity will be maintained throughout the study and in any dissemination of findings. On completion of the briefing session you will be provided with a written consent form and asked to sign it at this time. The signed consent form can then be placed in a secure box as you leave the room. Students who do not wish to consent can place the unsigned consent form in the same box to maintain anonymity.

Ethical approval has been granted by the Research Ethics Committee

For further information contact Brian Sharvin Lecturer at the Department of Nursing, Waterford Institute of Technology, Tel 051 845559, email: bsharvin@wit.ie

I volunteer to participate in this research study

Name of Student _____

Signature _____ **Date** _____

Appendix 4: Structured Observation Sheets for the OSCE

Module:

AFFIX STUDENT'S IDENTITY LABEL HERE

Examiners Name:

Station No:

Handwashing

Greet the student and give him / her the written instructions.

Please tick the appropriate box beside each performance criteria.

Performance Criteria	**Performed competently**	**Performed but not fully competent**	**Not performed or incompetent**
*Roll up sleeves, remove hand and wrist jewellery (wedding band allowed)			
*Turns on taps and checks water temperature.			
*Wet hands thoroughly under running water.			
*Using elbow obtain 5mls liquid soap from wall dispenser.			
Forms a lather with liquid soap and commence washing hands.			
*N.B. Total Handwashing process should take at least 15 seconds. *(a) wet hands and run palm to palm 5 times			

*(b) Rub right palm over the back of the left hand up to the wrist level 5 times and do the same with the other hand			
*(c) With right hand over left hand rub fingers 5 times and do same with other hand			
*(d) Rub palm to palm with the fingers interlaced			
*(e) Wash thumbs of each hand separately using a rotating movement			
*(f) Rub the tips of the fingers against the opposite palm using a circular motion. Also ensure nail beds are washed			
*(g) Rinse hands thoroughly under running water to remove all traces of soap			
*(h) Turn off taps using elbows or paper towel. Student should avoid splashing clothes or floor.			
*(i) Dry hands thoroughly using a disposable paper towel			
*(j) Discard paper towel in waste bin Open bin using foot pedal only to avoid contaminating clean hands			

Student's reflection/insight into own performance Satisfactory = demonstrates insight into own performance and correctly identifies errors and/or omissions. Unsatisfactory = lacks insight into own performance and does not identify errors and/or omissions. (max time 4 minutes)	Comments: ☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent
Grade and Comments This should include qualitative comments such as 'a good performance' or 'you need to practice more to develop your confidence' or the reason for failing if a fail is awarded. N.B. The student will fail the OSCE if they omit more than 2 performance criteria or are not performed/ deemed incompetent, unless he/she recognises the mistake and corrects it during the reflection. (See supporting document 'level descriptor sheet for OSCE's)	

AFFIX STUDENTS

IDENTITY LABEL

Module:

Examiners Name:

Station Number: **IM Injection Administration**

Greet the student and read out the written instructions.

Please tick the appropriate box beside each performance criteria.

Performance Criteria	Performed Competently	Performed but not Fully Competent	Not performed/ incompetent
Perform social handwash as per SARI guidelines			
Introduce self and explain the procedure briefly to the patient.			
Check prescription sheet and ensure medication has not already been given.			
From prescription chart ascertain the 5 rights of medication. **R**ight drug, **R**ight dose, **R**ight time, **R**ight route, **R**ight patient.			
Confirming Name / DOB/ hospital number of the patients ID band and signature of doctor.			
Check medication, check expiry date.			
Get appropriate syringe and needle, check expiry date and that packaging in tact.			
Draw up correct dosage of medication.			

Check all details with a registered nurse (assessor)			
Change needles, using kidney dish bring syringe, and cotton wool/ plaster to patient.			
Ensure patient dignity.			
Identify dorso-gluteal injection site using “cross” or ‘’double cross” method (as per local policy)			
Insert the needle at 90 degrees.			
Draw back plunger and check for blood.			
Inject medication slowly, approx 10 seconds per ml.			
Withdraw needle and replace patients clothing, advise to exercise limb and report any side effects.			
Do not re-sheath the needle			
Dispose of needle and syringe in sharps box and all other waste correctly.			
Record on the medication chart and get registered nurse (assessor) to co-initial.			
Student should state they will wash their hands			

Student's reflection/insight into own performance Satisfactory = demonstrates insight into own performance and correctly identifies errors and/or omissions. Unsatisfactory = lacks insight into own performance and does not identify errors and/or omissions. (max time 4 minutes)	☐ Satisfactory ☐ Unsatisfactory ☐ Not Completed

Grade and Comments This should include qualitative comments such as 'a good performance' or 'you need to practice more to develop your confidence' or the reason for failing if a fail is awarded. N.B. The student will fail the OSCE if they omit more than 2 performance criteria or are not performed/ deemed incompetent, unless he/she recognises the mistake and corrects it during the reflection. (Using the level descriptor sheet as a guide, place a 'tick' in the box beside the level descriptor that best describes your performance See supporting document 'level descriptor sheet for OSCE's)	Comments: ☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Module:

Examiners Name:……

Station No:

AFFIX STUDENTS

IDENTITY LABEL

Ward Urinalysis using Reagent Strips

Greet the student and read out the written instructions.

Please tick the appropriate box beside each performance criteria.

Performance Criteria	**Performed competently**	**Performed but not fully competent**	**Not performed or incompetent**
Student will wash and dry hands (SARI Guidelines)			
Put on gloves			
Obtain suitable reagent strips and check expiry date.			
Introduce self, Explain and discuss the procedure with the patient.			
Dip the reagent strip into the urine. The strip should be completely immersed and then removed immediately tapping against the side of the container to avoid drips.			
Hold the stick horizontally to avoid contamination between squares.			
Wait the required time interval before reading strip against colour chart.			
Document results using appropriate chart.			
Dispose of sample and all waste correctly, state that you would wash your hands.			

Student's reflection/insight into own performance Satisfactory = demonstrates insight into own performance and correctly identifies errors and/or omissions. Unsatisfactory = lacks insight into own performance and does not identify errors and/or omissions. (max time 4 minutes)	☐ Satisfactory ☐ Unsatisfactory ☐ Not Completed

Grade and Comments	**Comments:**
This should include qualitative comments such as 'a good performance' or 'you need to practice more to develop your confidence' or the reason for failing if a fail is awarded. N.B. The student will fail the OSCE if they omit more that 2 performance criteria are not performed/ deemed incompetent, unless he/she recognises the mistake and corrects it during the reflection. (See supporting document 'level descriptor sheet for OSCE's)	☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Module:

Examiners Name:

Station No: Administering a Nebuliser

Greet the student and give him / her the written instructions.

Please tick the appropriate box beside each performance criteria.

Performance Criteria	**Performed competently**	**Performed but not fully competent**	**Not Performed/ Incompetent**
1. Introduces self to patient and gains consent and co-operation			
2. States that they would wash hands if new patient			
3. Checks the nebuliser solution with the prescription			
4. Checks the patient's identity			
5. Checks expiry date on nebuliser solution			
6. Can place solution correctly into the nebuliser ensuring it is secured together properly.			
7. Ensures face mask is securely attached to the nebuliser			
8. Attaches tubing to compressed air flow meter and adjusts flow to correct rate of 6 Liters/Min			
9 Ensures solution is vaporizing sufficiently before placing on patient's face.			
10. Assists patient to put on the mask by placing the retaining straps over the ears and back of the head			
11. Aware the solution may take up to 15 minutes to vaporize			
12. Instructs patient to use call bell if there is a problem or when nebuliser is finished			
13. Post nebuliser, ensures the mask and tubing is disposed of as per nebuliser policy			
14. Offers patient face cloth to dry face when finished			

15. Offers patient mouth wash or gargle if required and ensures patient is comfortable before leaving the bedside			
16. States that a peak flow measurement may be required pre/post nebuliser			
17. Co-signs the medication in the prescription chart			
18. Assessor asks student **"Name two medications commonly used in nebulised form ? " 4 marks**			

Student's reflection/insight into own performance Satisfactory = demonstrates insight into own performance and correctly identifies errors and/or omissions. Unsatisfactory = lacks insight into own performance and does not identify errors and/or omissions. (max time 4 minutes)	☐ Satisfactory ☐ Unsatisfactory ☐ Not Completed

Grade and Comments This should include qualitative comments such as 'a good performance' or 'you need to practice more to develop your confidence' or the reason for failing if a fail is awarded. N.B. The student will fail the OSCE if they omit more that 2 performance criteria are not performed/ deemed incompetent, unless he/she recognises the mistake and corrects it during the reflection. (See supporting document 'level descriptor sheet for OSCE's)	Comments: ☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

AFFIX STUDENTS IDENTITY LABEL HERE

Module:

Examiners Name:

Station No: **Blood Pressure**

Performance Criteria	**Performed competently**	**Performed but not fully competent**	**Not Performed/ Incompetent**
1. Performs a social hand wash (SARI guidelines)			
2. Prepares and cleans equipment			
3. Introduces self and informs patient of procedures			
4. Ensures the patient is resting in a comfortable position			
5. Prepares the patient for the procedures, ensuring dignity .			
6. Locate the radial pulse			
7. Informs patient of BP procedure (mentioning pressure on arm)			
8. Remove any tight clothing from the arm.			
9. Applies the cuff such that the centre of the 'bladder' is over the brachial artery			
10. Locates the radial pulse. Squeezes the bulb slowly to inflate the cuff while still feeling the pulse. Observes the dial and note the level when the pulse can no longer be felt.			
11. Unscrews the valve and quickly releases the pressure of the cuff.			
12. Locates the brachial artery			
13. Places the diaphragm of the stethoscope over the artery, and hold it in place with thumb while fingers support that patient's elbow.			
14. Inflates the cuff to 10-15 mmHg above the level noted when checking the radial pulse.			
15. Loosens valve slowly noting systolic and diastolic readings			
16. Once the sounds have disappeared, opens the valve fully, to completely deflate the cuff and removes it from the patient's arm.			
17. Replaces clothing and ensures patient is comfortable, pull back curtain.			

18. Records blood pressure accurately within 5 mm Hg mercury			
19. Assessor asks student **"What would you expect the blood pressure to be if it were in the normal range".**			
20. Cleans and tidies away equipment on trolley.			

Student's reflection/insight into own performance Satisfactory = demonstrates insight into own performance and correctly identifies errors and/or omissions. Unsatisfactory = lacks insight into own performance and does not identify errors and/or omissions. (max time 4 minutes)	☐ Satisfactory ☐ Unsatisfactory ☐ Not Completed

Grade and Comments This should include qualitative comments such as 'a good performance' or 'you need to practice more to develop your confidence' or the reason for failing if a fail is awarded. N.B. The student will fail the OSCE if they omit more that 2 performance criteria are not performed/ deemed incompetent, unless he/she recognises the mistake and corrects it during the reflection. (See supporting document 'level descriptor sheet for OSCE's)	Comments: ☐Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Module:

Examiners Name:

Station No: Mouthcare

AFFIX STUDENTS

IDENTITY LABEL

Greet the student and read out written instructions.

Please tick the appropriate box beside each performance criteria.

Performance Criteria	**Performed competently**	**Performed but not fully competent.**	**Not performed or incompetent**
Arrange equipment on top of trolley as required.			
Introduce self and explain procedure to the patient.			
Student should state that they would now wash their hands as per SARI guidelines			
Put on disposable apron and gloves			
Prepare the cleaning solution (e.g. Oraldine) and mouth pack.			
Inspect the patient's mouth using a torch. and spatula paying special attention to lips, buccal mucosa (inside of cheek), tongue surfaces, floor of mouth and soft palate.			
Using a foamstick clean the patient's gums and tongue.			
Student should state they would offer water or mouthwash to the patient to rinse out their mouth.			
Apply lubricant to lips			
Clean dentures using a toothbrush and rinse well. Return dentures to container. [1]			

[1] Student may clean dentures at bedside using the basin provided or at the sink.

Leave patient in a comfortable position.			
Dispose of cleaning solution and mouthpack appropriately.			
Student should state they would now wash their hands as per SARI guidelines.			

Student's reflection/insight into own performance Satisfactory = demonstrates insight into own performance and correctly identifies errors and/or omissions. Unsatisfactory = lacks insight into own performance and does not identify errors and/or omissions. (max time 2 minutes)	☐ Satisfactory ☐ Unsatisfactory ☐ Not Completed

Grade and Comments This should include qualitative comments such as 'a good performance' or 'you need to practice more to develop your confidence' or the reason for failing if a fail is awarded. N.B. The student will fail the OSCE if they omit more that 2 performance criteria are not performed/ deemed incompetent, unless he/she recognises the mistake and corrects it during the reflection. (See supporting document 'level descriptor sheet for OSCE's)	Comments: ☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Appendix 5: Performance descriptors for each competency level.

Benner's (1984) Stages of Clinical Competence	Level of performance	Marking criteria	Performance descriptor
Proficient	**Fully competent**	All performance criteria 'ticked' as 'performed competently.	Student will have demonstrated a confident performance that is accurate in every detail and any minor errors or omissions are quickly identified and corrected without any prompting. Good technique and the correct reading/ result (where appropriate) was obtained.
Competent	**Competent**	All performance criteria ticked in a combination of 'performed competently' and 'performed but not fully competent'	Student will have demonstrated a performance that is safe but not always accurate. Any minor errors or omissions were identified and corrected although not always straight away. Technique may have lacked fluency but was satisfactory. The correct reading/result (where appropriate) may not have been achieved at the first attempt but this was recognised and the procedure repeated.
Advanced beginner	**Partially competent**	All performance criteria ticked in a combination of 'performed competently', 'performed but not fully competent' and 2 or less ticks in the 'Not performed or incompetent' column.	Student will have demonstrated a performance that was slow and lacked fluency but followed the correct technique. Several mistakes/omissions were made but either appropriate help was sought or it was recognised in the written reflection. The student may be deemed as safe because they can identify errors but requires more practice in order to develop a confident, accurate performance.
Novice	**Not competent**	More than 2 ticks in the 'not performed or incompetent' column.	The student has failed to demonstrate safe practice due to the reasons indicated on the marking sheet.

Appendix 6: Reflective Checklist for Clinical Skills Competence (RCCSC)

Reflective Checklist for Clinical Skills Competence (RCCSC)

Name Student: ……

Table of contents

Introduction

The purpose of the RCCSC booklet is to provide you with a learning framework that synthesises a clinical skills checklist with a reflective component using Gibbs (1988) reflective cycle with a self-assessment competence grading scale, to help develop and monitor your competence in clinical skills.

There are two sections to this booklet:

- Section 1 contains the instructions (the 'Grading Scale' is on page 22 at the back of the booklet to help you when grading your skill).
- Section 2 contains the self-assessment and reflective components
- Each skill has a checklist where the skill has been broken down into a series of 'steps' with a 'tick' box beside it.
- You are asked to complete four assessments for each skill during your practice placement.

Instructions for students.

There are 3 parts to be completed for each skill assessment:

Part 1 is the 'checklist' with the steps required to complete the skill
Part 2 is the space provided for key comments from your reflection and
Part 3 is where you grade your 'overall performance' of the skill.

Before completing a self-assessment using the RCCSC you need to:

- Familiarise yourself with the steps of the specific skill.
- Familiarise yourself with the 'Grading Guide' as detailed on page 22
- Prepare any equipment as necessary.
- When you feel ready, please carry out the skill in your own time.

Part 1: The checklist:

- Once you have finished doing the skill, refer back to the skill sheet.
- Beside each 'step' there is a 'tick' box. One column for each assessment (1-4).
- Think back to your performance and if you remember completing a step then put a 'tick' in the box for that assessment (i.e. 1st assessment – 4th assessment).
- If you did not complete the step, do not worry, just leave it blank.
- It is important that you are as honest as possible when self-assessing your performance.
- Make sure that you complete the appropriate sheet and enter the date and time and your student number.

Part 2: The Reflection:

- Please use the space provided for any key comments arising from your reflection on your performance of the skill. This could include any circumstances or events that might have affected your performance or if you did not get an opportunity to perform the skill.

Part 3: The self-assessed competence grading:

- With reference to the grading sheet on page 22, tick the box that best describes how well you performed the skill overall.
- Remember that it is important that you are as honest as possible when self-assessing your performance even if you feel you were 'not competent' in your performance.

Your booklet will be reviewed where you return to college in January please make sure that:

(1) You have included your *student number* in the space provided on the Front Cover and
(2) You have *dated* the skills sheets.

If you have any queries, please contact me: **Mr Brian Sharvin**, Department of Nursing, Waterford Institute of Technology, Tel: 051~ 845559 Email: bsharvin@wit.

SKILL SHEET 1: HAND WASHING

Please tick the box beside each 'step' that you completed and leave it blank if a step was omitted.

Skill Steps	1st Assessment Date:	2nd Assessment Date:	3rd Assessment Date:	4th Assessment Date:
Roll up sleeves, remove hand and wrist jewellery (wedding band allowed)				
Turn on taps and check water temperature.				
Wet hands thoroughly under running water.				
Using elbow obtain 5mls liquid soap from wall dispenser.				
Form lather with liquid soap and commence washing hands.				
N.B. Total Hand washing process should take at least 15 seconds. (a) wet hands and rub palm to palm 5 times				
(b) Rub right palm over the back of the left hand up to the wrist level 5 times and do the same with the other hand				
(c) With right hand over left hand rub fingers 5 times and do same with other hand				
(d) Rub palm to palm with the fingers interlaced				
(e) Wash thumbs of each hand separately using a rotating movement				
(f) Rub the tips of the fingers against the opposite palm using a circular motion. Also ensure nail beds are washed				
(g) Rinse hands thoroughly under running water to remove all traces of soap				
(h) Turn off taps using elbows or paper towel. Student should avoid splashing clothes or floor.				
(i) Dry hands thoroughly using a disposable paper towel				
(j) Discard paper towel in waste bin Open bin using foot pedal only to avoid contaminating clean hands				

Reflection 1st Assessment 'HAND WASHING'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 1st Assessment 'HAND WASHING'

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

1st ASSESSMENT : Date:_____

☐ **Fully Competent** ☐ **Competent** ☐ **Partially Competent** ☐ **Not Competent**

Reflection 2nd Assessment 'HAND WASHING'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 2nd Assessment 'HAND WASHING'

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

2nd ASSESSMENT : Date:_____

☐ **Fully Competent** ☐ **Competent** ☐ **Partially Competent** ☐ **Not Competent**

Reflection 3rd Assessment 'HAND WASHING'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 3rd Assessment 'HAND WASHING'

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

3rd ASSESSMENT : Date:_____

☐ **Fully Competent** ☐ **Competent** ☐ **Partially Competent** ☐ **Not Competent**

Reflection 4th Assessment 'HAND WASHING'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 4th Assessment 'HAND WASHING'

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

4th ASSESSMENT : Date:_____

☐ **Fully Competent** ☐ **Competent** ☐ **Partially Competent** ☐ **Not Competent**

SKILL SHEET 2: MOUTHCARE

Please tick the box beside each 'step' that you completed and leave it blank if a step was omitted.

Performance Criteria	**1st Assessment Date:**	**2nd Assessment Date:**	**3rd Assessment Date:**	**4th Assessment Date:**
Arrange equipment on top of trolley as required.				
Introduce self and explain procedure to the patient.				
Wash hands as per SARI guidelines				
Put on disposable apron and gloves				
Prepare the cleaning solution (e.g. Oraldine) and mouth pack.				
Inspect the patient's mouth using a torch and spatula paying special attention to lips, buccal mucosa (inside of cheek), tongue surfaces, floor of mouth and soft palate.				
Using a foamstick clean the patient's gums and tongue.				
Offer water or mouthwash to the patient to rinse out their mouth.				
Apply lubricant to lips				
Clean dentures using a toothbrush and rinse well. Return dentures to container.[2]				
Leave patient in a comfortable position.				
Dispose of cleaning solution and mouthpack appropriately.				
Wash hands as per SARI guidelines.				

[2] You may clean dentures at bedside using the basin provided or at the sink.

Reflection 1st Assessment 'MOUTH CARE'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 1st Assessment 'MOUTH CARE'

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

1st ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 2nd Assessment 'MOUTH CARE'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 2nd Assessment 'MOUTH CARE'

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

2nd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 3rd Assessment 'MOUTH CARE'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 3rd Assessment 'MOUTH CARE'

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

3rd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 4th Assessment 'MOUTH CARE'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 4th Assessment 'MOUTH CARE'

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

4th ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

SKILL SHEET 3: BLOOD PRESSURE

Please tick the box beside each 'step' that you completed and leave it blank if a step was omitted.

Skill Steps	**1st Assessment Date:**	**2nd Assessment Date:**	**3rd Assessment Date:**	**4th Assessment Date:**
Wash hands as per SARI guidelines				
Prepare and clean equipment				
Introduces self and informs patient of procedures, mentioning pressure on arm				
Ensure the patient is resting in a comfortable position				
Prepare the patient for the procedure, ensuring dignity				
Locate the radial pulse				
Remove any tight clothing from the arm.				
Apply the cuff such that the centre of the 'bladder' is over the brachial artery				
Locate the radial pulse. Squeeze the bulb slowly to inflate the cuff while still feeling the pulse. Observe the dial and note the level when the pulse can no longer be felt.				
Unscrew the valve and quickly release the pressure of the cuff.				
Locate the brachial artery				
Place the diaphragm of the stethoscope over the artery, and hold it in place with thumb while fingers support that patient's elbow.				
Inflate the cuff to 10-15 mmHg above the level noted when checking the radial pulse.				
Loosen valve slowly noting systolic and diastolic readings				
Once the sounds have disappeared, open the valve fully, to completely deflate the cuff and remove it from the patient's arm.				
Replace clothing and ensure the patient is comfortable, pull back curtain.				
Record blood pressure accurately within 5 mm Hg mercury (Ask RGN to check your reading)				
Clean and tidy away equipment on trolley.				

Reflection 1st Assessment 'Blood Pressure'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 1st Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

1st ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 2nd Assessment 'Blood Pressure'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 2nd Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

2nd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 3rd Assessment 'Blood Pressure'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 3rd Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

3rd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 4th Assessment 'Blood Pressure'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 4th Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

4th ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

SKILL SHEET 4: I.M. INJECTION

Please tick the box beside each 'step' that you completed and leave it blank if a step was omitted.

Skill Steps	1st Assessment Date:	2nd Assessment Date:	3rd Assessment Date:	4th Assessment Date:
Wash hands as per SARI guidelines				
Introduce self and explain the procedure briefly to the patient.				
Check prescription sheet and ensure medication has not already been given.				
From prescription chart ascertain the 5 rights of medication. Right drug, Right dose, Right time, Right route, Right patient. Confirming Name / DOB/ hospital number of the patients ID band and signature of doctor.				
Check medication, check expiry date.				
Get appropriate syringe and needle, check expiry date and that packaging intact.				
Draw up correct dosage of medication.				
Check all details with a registered nurse				
Change needles, using kidney dish bring syringe and cotton wool/ plaster to patient.				
Ensure patient dignity.				
Identify dorso-gluteal injection site using "cross" or "double cross" method (as per local policy)				
Insert the needle at 90 degrees.				
Draw back plunger and check for blood.				
Inject medication slowly, approx 10 seconds per ml.				
Withdraw needle and replace patients clothing, advise to exercise limb and report any side effects.				
Do not re-sheath the needle				
Dispose of needle and syringe in sharps box and all other waste correctly.				
Record on the medication chart and get registered nurse to co-initial.				
Wash hands as per SARI guidelines				

Reflection 1st Assessment 'I.M Injection'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 1st Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

1st ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 2nd Assessment 'I.M Injection'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 2nd Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

2nd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 3rd Assessment 'I.M Injection'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

PERFORMANCE 3rd Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

3rd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 4th Assessment 'I.M Injection'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 4th Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

4th ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

SKILL SHEET 5: URINALYSIS

Please tick the box beside each 'step' that you completed and leave it blank if a step was omitted.

Skill Steps	1st Assessment Date:	2nd Assessment Date:	3rd Assessment Date:	4th Assessment Date:
Wash hands as per SARI Guidelines				
Put on gloves				
Obtain suitable reagent strips and check expiry date.				
Introduce self, Explain and discuss the procedure with the patient.				
Dip the reagent strip into the urine. The strip should be completely immersed and then removed immediately tapping against the side of the container to avoid drips.				
Hold the stick horizontally to avoid contamination between squares.				
Wait the required time interval before reading strip against colour chart.				
Document results using appropriate chart.				
Dispose of sample and all waste correctly.				
Wash hands as per SARI Guidelines.				

Reflection 1st Assessment 'Urinalysis'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 1st Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

1st ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 2nd Assessment 'Urinalysis'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 2nd Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

2nd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 3rd Assessment 'Urinalysis'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 3rd Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

3rd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 4th Assessment 'Urinalysis'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 4th Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

4th ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

SKILL SHEET 6: NEBULISER

Please tick the box beside each 'step' that you completed and leave it blank if a step was omitted.

Skill Steps	1st Assessment Date:	2nd Assessment Date:	3rd Assessment Date:	4th Assessment Date:
Introduce yourself to the patient and gain consent and co-operation				
Wash hands as per SARI guidelines				
Check the nebuliser solution with the prescription chart and with RGN				
Check the patient's identity				
Check expiry date on nebuliser solution				
Place solution correctly into the nebuliser ensuring it is secured together properly.				
Ensure face mask is securely attached to the nebuliser				
Attach tubing to compressed air flow meter and adjust flow to correct rate of 6 Liters/Min				
Ensure the solution is vaporizing sufficiently before placing on patient's face.				
Assist the patient to put on the mask by placing the retaining straps over the ears and back of the head				
Inform the patient that the solution may take up to 15 minutes to vaporize				
Instruct the patient to use call bell if there is a problem or when nebuliser is finished				
Post nebuliser, ensure the mask and tubing is disposed of as per nebuliser policy				
Offer patient face cloth to dry face when finished				
Offer the patient mouth wash or gargle if required and ensure patient is comfortable before leaving the bedside				
Inform the patient that a peak flow measurement may be required pre/post nebuliser				
Co-sign the medication in the prescription chart with RGN				

Reflection 1st Assessment 'Nebuliser'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 1st Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

1st ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 2nd Assessment 'Nebuliser'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 2nd Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

2nd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 3rd Assessment 'Nebuliser'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

OVERALL PERFORMANCE 3rd Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

3rd ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Reflection 4th Assessment 'Nebuliser'

(Use this space to provide key reflective comments which could include whether there were any errors or omissions in your performance and what you would do to correct these)

PART 3: OVERALL PERFORMANCE 4th Assessment

(Using the 'Marking Guide' provided, tick the box that you feel best reflects your overall performance in this skill).

4th ASSESSMENT : Date:_____

☐ Fully Competent ☐ Competent ☐ Partially Competent ☐ Not Competent

Diagram of Gibbs Reflective Cycle.

The content has been removed for copyright reasons. For full diagram see Gibbs, G. (1988) *Learning by Doing: A guide to teaching and learning methods.* Oxford: Further Educational Unit, Oxford Polytechnic.

Appendix 7: Evaluative Questionnaire

Title of Study: Theory-Practice Integration for Clinical Skills Competence among Undergraduate Nursing Students in Ireland: A mixed methods study

The research project that you are participating in is trying to establish the effect of using of a Reflective Checklist for Clinical Skills Competence (RCCSC) on the development of clinical skills competence. During your last clinical placement in Semester 3 you were asked to complete a series of self-assessment exercises on a number of different clinical skills. This involved you completing the (RCCSC) which was to be returned on completion of the placement.

This questionnaire is part of the evaluation process to try and determine the value and effectiveness of using the RCCSC in Clinical Practice.

You are being invited to complete this questionnaire which will greatly enhance the evaluation process, however your participation in the survey is completely voluntary.

The questionnaire contains five sections. I am interested in your opinions and how you feel about the questions today. The information contained in this questionnaire is completely confidential and anonymous and will not be used for any purpose other than this study.

Thank you for completing this questionnaire.

Brian Sharvin

Section A – Clinical skills competence before going on clinical placement.

In this section we are asking you to try and recall how 'competent' you felt you were in performing clinical skills BEFORE you went on your first 2nd year clinical placement.

[Please refer to the competence level descriptor at the back of this questionnaire]

Please tick the appropriate box.

Please rate on a scale of 1 to 4 the following questions

	Not Competent	**Partially Competent**	**Competent**	**Fully Competent**
Overall, how competent do you think you were in performing clinical skills before you went on your first 2nd year clinical placement?	1	2	3	4
BEFORE beginning your 2nd year clinical placement, how competent do you think you were in performing the following:				
Handwashing	1	2	3	4
Mouth Care	1	2	3	4
Blood Pressure Monitoring	1	2	3	4
Intra-Muscular Injection	1	2	3	4
Urinalysis	1	2	3	4
Administering a Nebuliser	1	2	3	4

Section B – Clinical skills competence AFTER completing clinical placement

In this section we are asking how 'competent' you now feel you are in performing clinical skills having used the RCCSC in practice and completed your first 2nd year clinical placement.

[Please refer to the competence level descriptor at the back of this questionnaire]

Please tick the appropriate box.

Please rate on a scale of 1 to 4 the following questions

	Not Competent	**Partially Competent**	**Competent**	**Fully Competent**
Overall, how competent do you think you are in performing clinical skills having used the **RCCSC** and completed your first 2nd year clinical placement?	1	2	3	4
HAVING COMPLETED the RCCSC and your 2nd year clinical placement, how competent do you think you are in performing the following :				
Handwashing	1	2	3	4
Mouth Care	1	2	3	4
Blood Pressure Monitoring	1	2	3	4
Intra-Muscular Injection	1	2	3	4
Urinalysis	1	2	3	4
Administering a Nebuliser	1	2	3	4

Section C – This section contains questions related to how you used the RCCSC while on Clinical Placement. Please take the time to read and think about the question.

Tick one box only that best describes your response.

When on clinical placement, where did you mostly keep the **RCCSC** booklet?

☐ In your uniform pocket ☐ Stored somewhere accessible on the ward/ unit

☐ At Home ☐ Other (Please Specify) _____

Before performing a clinical skill, how often did you refer to the RCCSC?

☐Never ☐ Rarely ☐ Occasionally ☐ Most of the time ☐ Always

Please CIRCLE the response to indicate how strongly you agree or disagree with the each of the following statements relating to your experience in using the RCCSC.

Circle <u>ONLY ONE</u> number and do not circle between numbers.

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
			Disagree Strongly		
I was able to get an opportunity to perform the skills in the RCCSC at least once during my placement	1	2	3	4	5
I found that using the RCCSC helped me to develop my competence in performing clinical skills	1	2	3	4	5

I found that using the RCCSC helped me to develop my knowledge about the skills I was performing	1	2	3	4	5
I found that using the RCCSC helped me to have a better understanding of the patients experience when performing clinical skills	1	2	3	4	5
I found that using the RCCSC helped me reflect on how I perform my clinical skills.	1	2	3	4	5
I found that using the RCCSC helped me to remember the sequence of steps for each of the clinical skills.	1	2	3	4	5
I think more skills should be added to the RCCSC	1	2	3	4	5
I think the RCCSC should be provided to all nursing Students to help develop their competence.	1	2	3	4	5
I found the RCCSC easy to use	1	2	3	4	5

Section D – Personal Information

This information will help us to get a demographic profile of respondents, and assist us in analysing the information.

Gender: Male ☐ Female ☐ Age: 18 - 22 ☐ 23 +☐

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

Appendix 8: Focus Group Interview Schedule

Wednesday Dec 2nd 2009.

Good morning and thank you for agreeing to participate in the focus group. The purpose of this session is for me to try and explore some of the reasons for the responses in the questionnaire. This will help me to evaluate the use of RCCSC and its contribution to the development of competence in clinical skills. Can I begin by asking,

1. The questionnaire indicates that for most people their competence in clinical skills improved from being partially competent/competent before going on placement, to being competent/fully competent after having finished their placement.

   What sort of influence do you think using reflection and 'self assessment' had on this improvement in students' clinical skills competence?

2. Of the clinical skills identified, mouth care and nebuliser seem to be the skills that students have identified as being the least competent in. What do you think might be the reason for this?

3. For each of the skills, students were asked to complete up to 4 self assessments. Many students did not complete all the assessments for all of the skills;

   What do you think the reasons for this might be?

   What do you think could be done to encourage students to complete all the assessments?

4. When you were being observed by me in practice, how well do you think your performance was compared to when doing the skill without being observed?

5. Part of the self-assessment process was to look at the steps of each skill before performing the skill in order to aid your memory, and then perform the skill. However many students indicated that they only 'rarely' or 'occasionally' did this.

   What do you think might be the reasons for this?

How might students be encouraged to do this in the future?

What affect on skills competence do you think this might have?

6. If using reflection synthesised with 'self assessment' proves to be beneficial to developing students clinical skills competence what skills, if any, do you think should be included?

7. The questionnaire found that many students thought that using the RCCSC would be of benefit to other students. How do you think it might help?

8. Many students were not sure or disagreed that using the RCCSC helped them gain a better understanding of the patient's experience.

What do you think might be the reason for this?

9. How might the RCCSC be improved to make it easier to use?

10. Overall, how valuable would you say that using reflection synthesised with self-assessment is to developing competence in clinical skills?

11. What other comments would you like to make about your experience in using the RCCSC?

Thank you for your time.

Appendix 9: Table comparing the competency scores from the independent observer and the comparison of scores for pilot group using the self-assessment tool

	Clinical Skill						Ratio of agreed to not agreed scores
Scorer	**Hand washing**	**Blood pressure**	**Urinalysis**	**I.M injection**	**Mouth care**	**Nebuliser**	
Independent Observer	FC	C	FC	C	FC	C	5:1
Student A	FC	C	C	C	FC	C	
Independent Observer	FC	C	FC	FC	C	C	4:2
Student B	FC	FC	FC	FC	C	FC	
Independent Observer	FC	C	C	PC	C	FC	4:2
Student C	FC	C	FC	C	C	FC	
Independent Observer	FC	FC	FC	FC	FC	FC	5:1
Student D	FC	FC	FC	C	FC	FC	
Independent Observer	FC	C	C	C	FC	FC	5:1
Student E	FC	C	FC	C	FC	FC	

Appendix 10: OSCE Instructions For Students Objective Structured Clinical Examinations (OSCE)

Instructions for Students

On the day of your assessment please report to the seating area on the 1st floor outside the Clinical Skills Laboratories in the Nurse Education Building no less than 30 minutes before your allocated assessment time. Please do not be late as this is the only time available for you to complete this assessment. Failure to arrive for your allocated assessment time will result in a fail grade for this assessment.

- Please wear uniform, appropriate shoes, name badge, and tie up hair neatly if long; a professional standard of dress is expected. Nails should be cut short with no nail varnish. The male changing room will be in room 229 and the female changing room will be in G12. Students are reminded to keep all personal belongings/valuables safe as WIT cannot accept responsibility for any loss.
- Please ensure you bring a pen and watch.
- A lecturer will call your name and direct you into your appointed clinical skills laboratory.
- When you enter the laboratory you will be asked for your sticky labels.
- One lecturer will be in each laboratory. All stations have been allocated a set time period for completion and all students will be marked according to a precise set of criteria.
- Students will be required to complete two skills: Administration of a Subcutaneous Injection and Administration of a Nebuliser. The lecturer will read out a set of instructions at the beginning of your OSCE.
- Where a second skill would require you to wash your hands, you will **NOT** be expected to demonstrate a hand wash again as it has already been assessed. However you will be expected to inform the examiner at the appropriate stage of your subsequent skill demonstration that you would now wash your hands. You will not be required to wear apron and gloves for this assessment.
- If your skill involves interaction with a manikin you will be expected to introduce yourself and briefly explain what you are going to do but you will NOT be expected to engage in any further hypothetical conversation.
- When all skill stations are completed you will be invited to complete a ‘reflection’ form. This allows you the opportunity to correct any identified errors or omissions. Recognising and correcting a mistake in your ‘reflection’ **<u>may</u>** prevent you from being awarded a fail grade. (Maximum time allowed is 2 minutes).
- When all stations are completed or the allocated time period has expired you can /will be asked to stop and leave the room.

NB
All assessments will be recorded and kept on record.
You will be given feedback on your performance
The examiner’s decision is not negotiable and is final.
On completion of your assessment you will be asked to leave the building. This is to minimize disruption to other students.

Appendix 11: Letter to the Director of Nursing

Director of Nursing Name:……
Hospital Name:……..
Hospital Address

Date:

Dear .....,

My name is Brian Sharvin and I am a lecturer in the Department of Nursing at Waterford Institute of Technology. I am currently reading for a Doctor of Education at the University of Derby. I am planning to undertake a research project which aims to develop a clinical skills self-assessment tool for nursing students which would require me to access the clinical sites. Following approval from the ethics committee at Waterford Institute of Technology I will arrange to meet with you to discuss the project in detail and seek your concent.

The development of skilled clinical practitioners is an essential component within any nurse education programme. Evidence suggests that theory is not always applied in practice causing what is commonly termed the 'theory-practice gap'. By developing and testing a self-assessment tool for clinical skills, it is hoped that the research project will go some way to narrowing this 'gap'. The three main stages of data collection which are outlined below:

The first stage will be during the Objective Structured Clinical Examinations (OSCE) at the end of semester 2. Students' competence on selected clinical skills is assessed by nursing lecturers during these examinations. As part of the research, the students will be asked to complete a self-assessment on their performance in the OSCE. The competence scores from the OSCE and Self-assessments will then be compared with assessment scores from the next stage of the research

During the students Year 2 (Semester 3) the student will also be asked to complete a series of self-assessments using a Reflective Checklist for Clinical Skills Competence (RCCSC). It is proposed that the researcher will assess the student's competence on two of the selected skills completed in the OSCE using the same performance criteria. The student will also be asked to complete a self-assessment of their observed performance. This stage should take between 30-mins to 1 hr to complete.
The final stage of data collection will take place during Year 2, Semester 4 when the students return to college. Their completed RCCSC booklets will be collected and the students will be asked to complete a questionnaire evaluating their experience and may also be asked to participate in a focus group, lasting no more than 1 hr, to discuss and evaluate their experiences of the assessment process.

All data collected will be completely confidential and participants will remain anonymous and will not be used for any purpose other than this study and subsequent publications. There are no anticipated risks of any harm or discomforts to the student if they choose to participate in this research study and they are free to withdraw at any time during the project. All student participants have been fully informed and have signed written consent forms indicating their willingness to participate in the study.

I wish to gain access to the students while on clinical placement to complete the observed clinical skills assessment stage of the research. The students will be on their specialist placement in the 2nd year of the General Nursing Programme. Subject to approval, permission will also be sought directly from the appropriate CNM.

Where a skill will involve the student being observed interacting with a patient, a verbal informed consent will be gained. To protect the patient's dignity, no skill that requires the patient's bed to be screened will be observed at this time. It will be clearly identified that the purpose of the assessment is to observe the student's ability to perform a clinical skill and that no information about the patient will be collected and that the patient is free to decline if they so wish. As a registered nurse I acknowledge that I am bound by the code of conduct and will at all times behave in a professional manner during any direct involvement with patients. I will uphold the principles of maintaining respect and dignity and of maintaining confidentiality at all times throughout the study. I have attached a copy of the full proposal for your information.

Yours sincerely

Brian Sharvin, Lecturer, Department of Nursing

Waterford Institute of Technology, Cork Road. Waterford

Tel: ++ 353 51 845559

Email: bsharvin@wit.ie

Appendix 12: Information for patients

TITLE OF STUDY:

The development of a Reflective Checklist for Clinical Skills Competence (RCCSC) and an examination of its effectiveness on the transfer of simulated learning to the clinical practice setting among undergraduate nursing students at one third level college in Ireland: A mixed methods study

Who is doing the research?

My name is Brian Sharvin and I am a Registered Nurse and a Lecturer from the Department of Nursing at Waterford Institute of Technology currently studying for a Dr in Education at the University of Derby

What is the study about?

Competence in clinical practice skills is essential for nurses to practice safely and is essential for registration as a nurse. The focus of this research as part fulfilment of my Doctoral Studies, is to develop a teaching and assessment method that ensures student nurses competence in the clinical placement across a range of clinical skills.

The study will involve me coming to the hospital ward to observe a student nurse carrying out a range of nursing skills including: washing their hands; taking a patient's blood pressure; testing a urine sample and administering a nebuliser. It is important that you realise that the research is not about you as a patient but about the student's ability to carry out the various nursing skills. The student has consented to participate in this study.

The study has received ethical approval from the Dept of Nursing at Waterford Institute of Technology and from the HSE, South East Research Ethics committee

What will your participation involve?

If you are agree to participate in the study it will simply mean that you are agreeing to allow me to observe the student while he or she takes your blood pressure, and/or provides you with a Nebuliser and/or test a sample of your

urine. No personal information about you will be needed and there will be no records kept of your participation in the study.

How long will it take?

It should take no more than 10 minutes and once completed you will not have to be involved any further. Remember, I am only observing the students clinical skills.

ARE THERE ANY CONSEQUENCES IF I CHOOSE TO BE PART OF THE STUDY OR IF I WANT TO OPT OUT PARTWAY THROUGH THE STUDY?

There is no obligation on you to participate in the study. If you choose to participate you are free to withdraw your consent at any time without obligation to anyone. This means you can change your mind at any time, even during the observation just let me or the student know and I will stop immediately.

Thank you for taking time to read this leaflet, and for considering taking part in this study.

Yours sincerely,

_____

Brian Sharvin

Lecturer in Nursing

Waterford Institute of Technology

Appendix 13: Focus Group Transcript

This is the transcript from the focus group. The purpose of the focus group was to probe deeper into the responses provided in the questionnaire (See separate section on questionnaire analysis) and therefore trigger questions have been used to prompt the students and their responses were then digitally recorded and transcribed below. The student identity codes used here differs from that used for the 'self-assessment' analysis due to confidentiality assurances provided to the students. I have highlighted some keys responses that I feel are pertinent to my study but need to undertake a more detailed content analysis.

Line No (Quote No) (I.D No e.g S1) Transcription (code)

(INTRODUCTION)

(1) ME:

Good Morning and thank you for agreeing to participate in this focus group. As previously outlined, the purpose of the session is for me to try and explore further some of the reasons for the responses provided in the questionnaire. This will help in the evaluation of the self assessment tool and to further explore and understand the use of self assessment relating to clinical skills and its contribution to the development of competence in clinical skills.

(Overall influence on competence)

To begin with, preliminary findings from the questionnaire indicate that students perception was that their competence in clinical skills had improved from before going on clinical placement to having completed the placement. What sort of influence do you think the use of the self-assessment tool had on this improvement?

(pause)

(2) S1: ‘em’

(3) Me ‘*students name?’*

(4) S1: ‘yea, no, I just thought it made you more aware of, kind of, you know, the steps to take when you’re doing a task or something and, do you know if you felt you needed to look at the book or whatever.

(5) Me: you felt that having the book, it helped you remember some of the steps?

(6) S1: yea, that’s exactly it.

(7) Me: would everybody else agree with that?

(8) General murmurs of ‘yea’

(9) Me: What other reasons are there as to how the book may have helped?

(10) S2 ‘em’

These comments show some of the positive influences of using the tool related to learning: memory aid/ steps etc

(11) Me ‘*Students name?’*

(12) S2.: I would just like to say, the type of placements we were on, it wasn’t like, I mean there wasn’t a huge amount we could actually do on them, but having the book made we could actually do, we knew we could do certain things and we could concentrate on those things.

(13) Me: Do you think if you didn’t have the book you wouldn’t have thought of them?

(14) Some group members and; ‘yea’

(15) S2: yea definitely

(16) Me: So having the book made you think about different skills?

(17) Group: ‘yea’

(18) S2: yes

(19) Me: ‘Ok’

(20) Me: So from that aspect it actually made you more conscious?

(21) Group: yea

(22) Me: If you had the book and it was nothing to do with the research do you think you would even use it? Less or more?

(23) (Group Mumbling)

(24) S3: I’d use it anyway

(25) Me: So, if it was being used without being part of a research project, it was just something we gave to you, for example if we said

Comments show positive influence on learning, Awareness, memory aid, motivation factor/stimulus etc, focus on task

'here's a booklet to help you develop your skills competence while out on placement', what benefit do you think
it would have been to you?
(26) S4: I probably would have used it a bit at the start and then,
I think, well..
(27)S5: I think you felt you had to be kind of honest in it, you know, because it was research.
(28) Me: Ok, but if the book was being used by you in practice it wouldn't be something that we would be saying 'we want to take this in for an assessment'.

Comments here show some positive influences in learning, motivation, etc

It was designed to act as an 'aid memoir' for students, to help you to develop your clinical skills.
(29) S6: It was useful like you know, for some of the more difficult skills like I.M (intra muscular injection) but for hand-washing there wasn't any need for it anymore because everyone knows how to do it by now.
(30) Me: Ok you're all quite good at that (*hand-washing*) by now?
(31) Group. Yea (nods of agreement)
(32) Me: Ok, so, are you saying that some of the skills would be more beneficial, the more difficult ones?
(33) Group: yea.

Categories beginning to emerge regarding positive learning factors and some negative factors

(Looking at book and where it was kept)
(34) Me: I was going to come to a question about that later but maybe I'll ask that now because what I found was, part of the self assessment process was to look at the steps of each skill before performing it in order to aid your memory. However, many students indicated that they only rarely or occasionally looked at the book before doing the skill. What do you think might be the reasons for this?
(35) S7: Time concerns? Like you might not have thought about looking at the book before you did the skill and then you kinda like at the end of the day or like later you thought 'oh yea I did that skill so I'll assess myself on it now but you've not looked at the steps before it.
(36) S6: I think that once you've looked at it once you kinda know the steps. Like I felt that I didn't know them like cause it had been nearly a year but like

when I looked at the book I knew them and like didn't need to look at them again but like I knewthey were there.

(37) Me: You felt that you remembered the steps fairly quickly?

(38) S6: Yea, like once you looked at them you kinda know what they are then, it's kinda imprinted anyway, and you perform it and you're assessing yourself anyway.

(39) Me: I mean that was part of the reason for doing it. The idea was to encourage people to look at the booklet beforehand so that students could remind themselves of the steps involved.

Emerging themes on the learning process. Use of reflection, self-assessment, self awareness/concept, confidence, competence , learning achievement/goal=competence= embedded etc.

The suggestion was that after completing 4 assessments you wouldn't need to look at it again, it would be instilled. What appears to be indicated from the questionnaire is that some people said they rarely looked at it beforehand anyway. So, what reasons can you think of for students not to do that if it was meant to be a prompt ?

(40) S2: I would have felt the awkwardness of taking out the book. Say you were doing an IM and em looking at getting the stuff ready, it was awkward. I would have gone through the process of doing it and then afterwards seeing if, did I do all the steps?.

(41) Me: That brings in the question of where did you keep your book , for example?

(42) S2: In my pocket:

(43) Me: Ok, because results from the questionnaire show that some people said they kept it on the ward or somewhere else.

What reasons could be given for not keeping it in their pocket?

(44) S1. It was actually too big.

Some negative factors on learning beginning to emerge. Practicallity of the book, feeling of awarkedness (self concept?),

(45) S8. (interrupts) : I mean like, if a staff nurse asked you to give an IM you say 'yea, no bother' and you go and get your stuff ready and do it. You're not gonna go 'yea, just give me time to read this'

(46) S2: Yea that's exactly it

(47) (Other sounds of agreement from the group)

(48) S8: Yea, you know cause they might think that, they might get angry and go like 'oh maybe they're not competent enough to give it, you know 'I shouldn't give it to them to do' so like you're gonna want to go and like do it straight away.
(49) S2: Yea like we're able to do so little on these placements, that the fact that we're so novice you're..
(50) S8 (interrupts) Asked to do something.
(51) S2 : Asked to do something, you just want to do it, you're keen to do it,
(52) S8: For the experience like.
(53) S1: you don't want to be holding back as (S8 '*students name*') says like waiting to look at the book and then saying, I'll do it now like. You're so keen to do it, you do it. I looked at the book after to see if I'd gone through the whole process correctly.
(54) Me: Do you think that a staff nurse who is going to get you to do a particular skill, should identify whether or not you're competent or feel competent in doing that before hand?
(55) S5: I think they feel that you should be competent before you come to the placement.
(56) S9: And sometimes they might ask you are you comfortable doing that and you say 'yes' then.
(57) Me: Do you think they didn't realise, I mean, you are going in there as 2nd year students', you've only had a few weeks in year one. Doing very simple things, you didn't have very much experience.
(58) S5: I don't think they know that. They think you should know a hell of a lot in 2nd year
(59) S9: ea its like there's a massive difference. Like 1st year you can get away with a lot but 2nd year well like you should know stuff now.
(60) Me : Would most of you agree with that?
(61) Most of Group (yea)
(62) Me: You felt that there was a certain expectation of you to have better skills?
(63) Group: yea

(**What the Nursing Dept could do to help support students prior to placement**)

(64) Me: Currently you're taught clinical skills in the Labs and then at the end of term you are assessed by OSCE (Objective
Simulated Clinical Examination) on 6 skills. What else do you think we could do as a department to help you make that expectation in year 1?

(65) S10: I felt competent after the OSCE.

(66) Me: Did the rest of you fell the same?

(67) S10: Yes ,yes, Definitely (group sounds of agreement)

(68) Me: When you came back then in September, I mean a lot of people seemed to indicate in the questionnaire…(Interupted)

(69) S9: You feel like you need a little refresher before you go on placement, for some of them anyway.

(70) S10: Definitely, definitely, yea (other sounds of agreement from group)

(71) Me: Do you mean you get a bit stale after having the summer off?

(72) Group: yea

(73) S2: It would be no harm, you get, there's only one week back in September and literally we're just thrown back into it and the portfolio• is thrown at us and you're trying to get your head around that. The first week like, I felt it was a waste of time, there was only one week back and everything came at us and all of a sudden we're gone. I just felt that in that week we could have spent a couple of days maybe doing Osce's or whatever again, it might maybe just to refresh us again, you know?

(74) Me: So, you're suggesting some sort of skills update prior to going out to placement?

(75) S10: Yea

(76) S11: You could give it to us on the January placement maybe?

(77) Me: Yes, but at the same time, we need to ensure that the specialist placements that you are going to don't have high expectations of you because you are really only just finished your first year.

• The 'Portfolio' forms part of the assessment for clinical placement. It is designed for students to provide evidence of their competence development within the 'domains of practice as required by the nursing board (An Bord Altranais, 2005)

(78) S4: I found that my preceptor really didn't know what I could do. They really didn't know what expectations to have, eh they wanted to know what skills I did or didn't have.
(79) S11: I found that some of them looked at the book and they said it was a good idea to have it especially for the IM because there is so many parts in it like.
(type of skills in the book)

(80) Me: I'll maybe come back to that one because that was one of the things I wanted to talk about, the nature of the type of skills that are in the book. Should there be some taken out, like for example, you suggested 'hand-washing' and others maybe put in instead. Ok?
(81) (Me): Now, of the skills identified, Mouth care and Nebuliser seem to be the skills that students identified that they seem to be the least competent in. What do you think might be the reasons for that?
(82) S9: well in the specialist placements I mean you're not gonna get to do mouth care that much. Well I don't think you are anyway.
(83) "Yea, Yea, that's right"((sounds of agreement from group members)
(84) S9. It's more a thing on the wards, you're not gonna be doing like mouth care in A&E or mouth-care in Psych, you know? So by not getting practice it reduces your confidence.
(85) S7. I didn't do any mouth care
(86) (general sounds of agreement from group members)
(87) Me: Again, that was one of the skills that seemed to be not completed, certainly, and nebuliser
(88) S2: The nature of the placement didn't lend itself to doingthose particular skills
(89) (sounds of agreement from group)
(90) Me: Alright then, what other skills do you think could or should have been in there instead of those?
(91) S2: Well as regard to me I did things like, I showered, eh I helped feed, I eh helped people dress, but only those type of skills, you know, personal hygiene and things like that.
(92) Me: That was in the care of the elderly placement?

(93) S2: Yea
(94) Me: What about other placements? You were in maternity, Paediatrics, A&E, Theatres
(95) S7. In A&E we used aseptic technique. Cleansing wounds and dressings
(96) S2: yes, yes,
(97) Me. So in A&E you did a lot of wounds and it would have been useful to have some additional skills training on that?
(98) S7. Yes, definitely.
(99) Me: Ok. This is something we are trying to develop, in the future. We're trying to develop a tool that will benefit the students. It's not something we want to use to assess you. The idea is to try and improve students' competence in their skills. This is something to support that and what we are actually looking at is this something that can help do that?

(number of assessments completed)
(100) Me: Alright then, let's move on. The other thing is that for each of the skills, students were asked to complete up to 4 assessments and many of the students did not complete all of the assessments for all of the skills. What do you think might be the reasons for that?
(101) S9. Maybe they didn't get to do those skills?
(102) Me: Ok, I can accept that in some cases it may be that the opportunity didn't arise but do you think that there were cases where opportunities did arise and people just didn't bother complete the book.?
(103) S7: Well as far as I'm concerned if the opportunity arose I took it but if like some times, just because, for me the opportunity didn't arise on the placement so its as simple as that.
(104) Me: You feel that if it did arise you would have completed the booklet?
(105) S7: Yea, I filled in all the hand-washing because I had washed plenty of times but as regards other skills it just didn't happen (sounds of agreement from group).
In the paeds ward, sorry, and in the maternity ward those skills just didn't happen. I didn't get to do any. I didn't tell you lies, I didn't think you'd want me to.
(106) Me: No, no that's what I want, I wanted to.

(interupted)

(107) S5: You can't do anything in paeds anyway.

(108) S4 No, no there is not much you can do on paeds at all.

(109) (sounds of agreement from group).

(110) S5: They're minors, you can't do anything, you can't touch them.

(111) Me: Ok, you can't administer drugs, we're aware of that, so you can't give a nebuliser, you can't give an IM injection, but what other, I mean, what sort of things were you allowed to do?

(112) S7: Take out a cannula..

(113) S1: Yea but the parents were always there anyway.

(114) (sounds of agreement from group)

(115) S7. You might feed a baby or you might get a chance to wash a baby but the parents were always there doing everything.

(116) Me: What about observations for example, …temperature, pulse, blood pressure?

(117) (sounds of agreement from group).

(118) Me: You were able to do those

(119) (sounds of agreement from group)

(120) Me: NG feeds? Were you allowed to do those?

(121) S4: We did them in care of the elderly, yea.

(122) Me: No, I mean in paediatrics you were limited in what you were allowed to do, but what about A&E?

(123) S4. We got to do a lot of dressings

(124) (sounds of agreement from group)

(125) S3: And IM injections

(126)) Me: And what about nursing observations, did you get to practice them?

(127) (sounds of agreement from group)

(128) Me: So are those the sort of skills that would be beneficial to include in the booklet?

(129) (sounds of agreement from group)

(Perceived competence in skills when being observed)

(130) Me: Ok. Moving on. I would like to explore how you felt when I came around to observe you in practice. I'm wondering if you think your performance was affected by my being there. So what I'm asking is, how do you think you're

performance would be affected with me being there observing you, compared to how you would perform your skills when I wasn't there?

(131) S1. The same…

(132) (sounds of agreement from group)

(133) S1: You'd probably try a bit harder but it would be the same.

(134) (sounds of agreement from group),

(135) S1: You'd be aware like but you'd just do the thing.

(136) S3 you'd feel a bit awkward like, a bit nervous like.

(137) Whole group 'agree: Yea yea!

(138) Me: You found it a bit nervous when ever I was standing looking at you?

(139) S.3 Yea but, it didn't affect your performance. It made you a bit nervous but your performance was fairly similar.

(140) Me. Em, ok, thanks for that. It would seem that apart from the nerves your performance wasn't really affected by my presence

(141) (general sounds of agreement from the group)

(Other skills to be included in book)

(142) Me: If the research shows that self assessment proves to be beneficial for developing students clinical skills competence, I'm just trying to think, what other skills should be included? You have already identified dressings, aseptic technique, what other skills do you think should be included.?

Long silence before response

(143) S7: Maybe something like ECG do you know like? In A&E we do like loads of them, like you wouldn't be asked to do one every day like do you know.

(144) S9: We hadn't done them in class at all so like when we went out they just kinda of expected you to know like…

(145) (sounds of agreement from group)

(146) S9: We didn't have a clue like.

(147) S5. And blood sugar as well.

(148) S9: And blood sugar, it's done an awful lot in A&E anyway.

(149) Me: So blood sugar, possibly ECG, aseptic technique and

what are the ones we could take out?
(150) S6: Hand-washing
(151) S1: Mouth-care
(152) S7: And manual blood pressure cause in placement we always use machines.
(153) (sounds of agreement from group)
(154) Me: It's interesting you say that because evidence from the UK suggests that nurses in the UK are lacking in confidence and competence in using manual sphygmomanometers because they don't get practice, and there has now been a recommendation that they now have to be taught to use the manual ones.
(155) S7: You have to use them on maternity.
(156) S3: Yea but they're very hard to locate. When I was on my first ward my CPC said that I have to do manual blood pressure and you have to keep doing it until you get competent but like it took 2 weeks before they could get a manual blood pressure on the ward because they didn't have one and they had to order one especially for me (laughs). So I mean like, it's hard to get the opportunity to do it like.
(157) S5: I've had to use manuals on the community.
(158) Me: So do you think then that when we are teaching blood pressure we should be teaching both manual and using the machine but also assess both?
(159) S5: Not sure about assessing using machines, like there's not much to it?
(160) (sounds of agreement from group)
(161) Me: Ok, well if you were taking someone's blood pressure with a machine, would you take the first reading, the second reading, the third reading?
(162) S5: The first
(163) Me: How many readings are you supposed to take?
(164) S5. I've only ever done one…
(165) (sounds of agreement from group).

(166) S5: If I thought it was totally out of the range, I'd do it again.

(167) Me: It has been suggested that with the machines, you aresupposed to do it three times, and then take the average.

(168) S1: We were never taught that

(169) (sounds of agreement from group)

(170) S10. As regards, you telling us that, none of my preceptors would have done it 3 times.

(171) Me: Apparently, there is some suggestion of unreliability with the automated blood pressure machines and therefore it would appear that it's important to check it a couple of times to make sure you get the correct reading. I would need to look at the research evidence to clarify this but maybe its something we could include to ensure that you are doing those things correctly and then OSCE them. Ok?

(Would book benefit others?)

(172)Me: Moving on I would like to explore another area. The responses from the questionnaire indicated that many students thought that using the self assessment booklet would actually be of benefit to other students. How do you think it might help other students, besides 2nd year, you know 1st, 3rd 4th. How do you think using a self assessment booklet that included other skills in it would be of benefit?

(173) S10: Much more benefit I would imagine, in 3rd year because the common jury is that students go into 3rd year and even final year and then they realise they can't do skills.

(174) S7: And we can't do manual B/P

(175) S10: Yea and I think that after doing 2nd year and going out to our placement in 3rd year it would be much more benefit because medical wards and surgical wards are going to lend themselves much to them sort of skills anyway,

(176) (some sounds of agreement from group)

(177) Me: Ok I mean that when your finished your 2nd year placement, when you come back, it will be interesting to see what you'll be looking for in relation to skills training. Maybe I can add that one in nearer the time. But, what about other people? How do you think the booklet could benefit other students?
(178) (Long pause)
(179) S3: It would give them confidence like. If they looked at it they'd know how to do it if they hadn't looked at it in a while.
(180) Me: So its back to the main use of the booklet, in that it is purely just to remind you of the steps?
(181) S3: A revision like.
(182) S5: The steps do sink in.
(183) Yea, Yea. (sounds of agreement from group)
(184) Me: They do sink in from looking at them?
(185) Yea, Yea, Definitely. (sounds of agreement from group)

(186) Me: If the book was smaller, would that help?
(187) S1: Yea..
(188) (sounds of agreement from group)
(189) S1: It was really kind of bulky in your pocket. I felt, do you know, once you try and take it out, your trying to pull it out.
(190) Me: Ok. So if it was more a smaller size (shows example to the group) would it be easier to use?
(191)Yea, definitely (sounds of agreement from group)

(Number of self-assessments needed for competence)
(192) Me: Currently the booklet requires you to complete 4 assessments? What do you think would be the appropriate number ?

(193) S2: I think the assessments are fine. 4 is probably a lot really. Four is probably a lot now to be fair like.

(194) (Sounds of agreement from group)
(195) Me: What do you think would be the right amount?
(196) S2: Two
(197) S5: Two or three, if you add even more skills then you could do two of each
(198) (Sounds of agreement from group)
(199) Me: Do you think that by the time you've completed two self assessments you would feel fairly confident?
(200) S6: Its kind like you do something once and then like you kinda go well you know I've done that so that when you've done it a 2nd time you feel well, yea, I am confident.
(201) Me: In my analysis of the booklets, the general picture seems to be that people were missing a few steps in the first assessment but as they continued, the number of missing steps decreased, therefore developing their competence. But ok I hear what you're saying that maybe four is to many. Three could be enough and if you get to two and your ticking all the boxes you might not need to do the third one?
(202) (Some sounds of agreement from group)
(203) S1: Yea, I thought that for some of the skills you kinda do need three. Like for the more complicated ones but for the hand-washing you had it done once.
(Being able to self assess)

(204) Me: Ok well, what about using the overall descriptors in determining competence? You know at the back of the book where it tells you 'partially competent', 'competent', 'fully competent'. How did you find using the descriptors to make your judgement?
(205) Long pause
(206) S3: It was fairly easy, yea.
(207) (Sounds of agreement from group)
(208) Me: 'S3 *students name'* thinks it was easy, anybody else?

(209) S1: I agree, it was fairly straight forward, like we'd used it before. You know, for the OSCE.

(210) Me: You thought that from reading the descriptors it was easy enough to determine what level you were?
(211) Yes, yes, it was. (Sounds of agreement from group)

(Understanding patients)

(212) Me: Many students were not sure or disagreed that using the booklet helped them gain a better understanding of the patients experience. What might be the reasons for that?
(213) S9: Because you're to busy focused in getting all the steps in, you know the ones you have to get in so like if you know the steps then you can look after the patient.
(214) Me: Are you saying that the booklet made you focus on the steps and not on the patient ?
(215) S9: No not that much, like for the nebuliser it says like 'the face cloth' and all the care after afterwards and that was kind of good like for you to remember that.
(216) Me: What could be included in the future to improve on this?
(217) S9: It would be better to have more points that were patient focused in the steps to remind you about 'don't forget there is a patient at the end of this'? Its not just a thing you're doing there is an actual person there.
(218) (sounds of agreement from group)
(219) Me: But at the moment you're saying it probably doesn't have that?
(220) S2: No and I think that's what we said earlier. We were more inclined to do the actual task itself and then look at the book. I think if you were looking at the book when you were doing the task it would take away from the patient. You'd be treating the patient more or less the way you would the dummy•

• 'Dummy' refers to the manikin's used to simulate patients in the clinical skills laboratory

in the lab.

(221) S9: Yea like, you were saying earlier about doing the blood pressure three times. Its not very comfortable for the patient like, is it? The patient doesn't want to be there getting his blood pressure done three times

(222) Me: Yes , but the other side of it is you want to make sure you are getting an accurate reading.

(223) S9: Mmm, I know what you mean.

(224) Me: Ok. Maybe we need to include something extra on that aspect of care. Well then, what other things do you think might improve or help improve the skills booklet to make it easier to use?

(225) (Pause)

(226) Me: Is there anything that you feel could be done with it to make it easier to use?

(227) S2: I think that, I know the staff have a lot of stuff to sign off, maybe if you cut it back to two instead of four like, and maybe the two times you have to do the skill you have to get it signed off•. It might make you more aware of it. It might make the preceptor know that you have to know each step of the way. So, if you go in and you have to draw up your IM (*intra-muscular*) injection inside in the clinical room before you go to the patient so, and the nurse says to you 'right now, before we go to the patient do you know the steps?' and you forgot and she'd sit you down and talk to you. That might make you more aware of it but the fact that we didn't have to have anything signed of was …really..? (pause)

(228) Me: Yes, well, that might defeat the purpose. The idea behind this is to try and encourage students to take responsibility for developing their own competence. We already have assessment tools out in clinical placement for the staff nurse to formally assess your overall competence. If you had to get things signed off that would make it formal. The whole idea was that the self assessment booklet would act as an aide memoir to help you as a person. Where you feel that 'I want to get better at doing certain skills'. Where you feel good at skills, that's fine, where you don't , this process was to help you try

• 'Signed off' refers to when a student requires a staff nurses signature as evidence of completing a task.

and improve that. If you bring in a third party, then it becomes a formal assessment.

(229) S9: Yea but you want to show your preceptor that you can do skills, you want to reassure them so that they'll give you more opportunities to do more. So that they'll say 'oh she actually knows that' then you're grand cause they're always asking 'are you sure you know what to do?' like.
(230) Me: So do you still feel that as a second year you want to show the nurse ' look I can do things'
(231) S9: Especially in short placements like cause you're only there for a short time and they don't get to know you like.
(232) Me: Is that a confidence thing though that you as a student have to work on?
(233) (General agreement from group)
(234) S4: Personally like, I feel we were only back here one week and then straight on to placement and straight away I was lacking confidence. We'd the whole summer of and I just feel like, back for one week, had a few classes, the portfolio was the main thing we had to look at and em I reckon that's why I lacked confidence anyway.
(235) Me: So even though as suggested earlier, having completed the OSCE's you felt confident in those skills?

(236) S4: Yea but maybe its because I'm a mature student and I have 20 years experience working in hospitals anyway, probably would stand to me.
(237) S9: There was a big gap from doing the OSCe's and going into placement.
(238) Me: Ok well then let me put the question back to the group. Having completed the OSCE's did you all feel confident? You know, 'yea I'm ok, I could do those things'?

(239) (Some minor sounds of agreement from group)

(240) Me: But by the time you came to the ward you thought 'I've forgotten it now'?
(241) (Sounds of agreement from group)
(242) Me: So your confidence does decline over that summer period. Would that be a general feeling?
(243) (Sounds of agreement from group)
(244) S4: I think that if I was going back to a medical ward for 6 weeks in September and you gave me that book, I'd come back with it full.**I'd be competent in all them skills,** no bother its just in the specialist placement you didn't get to do them all.
(245) Me: So then does it mean that the skills that were in the booklet were maybe not appropriate for the placements?
(246) (General sounds of agreement from group)
(247) Me: Therefore if it had been more focused ..

(interrupted)
(248) S5: Yea for 1st year or third year in medical or surgical
(249) (Sounds of agreement from group)

(250) S2: I think maybe a book on patient orientation, how to approach a patient, how to talk to patients, that kind of thing maybe, for these kinda placements, looking at communication skills maybe…
(251) (Sounds of agreement from group)

(252) S2: And then in third year, skills on actual doing things. You know what I mean like? Maybe if this booklet was more like communication, how you talk to patients in psychiatry, care of the elderly, paediatrics, maternity. There wasn't much I could do anyway, but definitely I could build up my communication skills like' how you feeling today?' and you know what I mean? That kind of thing as we were doing in class like. That would be more beneficial, and then in the third year give us a book on the other OSCe's and things like that, you know?
(253) S5: I agree with (S2 '*students name*') all this college and like student nurses are so highly educated now but you can't

learn bedside manner from a book. I've seen it, ok so you know it all, but you might be horrible to the patient like.
(254) Me: Ok, but that is what the clinical placements are for?Here we are talking about a simulated environment and that's what it is. It's very much simulated. Its acting and role playing and using manikins and clinical scenarios. It's not until you are out in practice that you get an opportunity to put those simulated skills into practice in the real world.
(255) S5: But all this high tech theory like yea I mean, I don't know like, I think the patient can be forgotten about from time to time.
(256) Me: Ok. So do you think more focused skills with patient activity in it and how to communicate with patients would be of benefit?
(257) S5: Yea I think we forget how to communicate with patients.
(258) S1: Yea

(259) S5: Yea, there's an awful difference between the older nurse and younger nurses who were taught differently.

(260) Me: Right, so there are a few things there in relation to improving the booklet. Reducing the number of assessments, focusing the skills that reflect the placements that you are going to and incorporating more communication when dealing with patients, into it.
(261) S5: And interpersonal skills
(262) (Sounds of agreement from group)
(263) S2: Another thing I would have found like, in my first morning going to maternity, three babies were born, I suppose in an hour. I mean if I was going in there as a fella right, an 18 year old, it would have been daunting, its only when we came back last week that we were shown how to feed a baby like, you know what I mean? Most people have their maternity done now, to give you an idea, if I was a young fella like going in there with no experience of feeding a baby, the first thing the nurse said to me was 'will you get a bottle and start feeding that baby there' I'd be absolutely daunted. Yet I was only doing the skills like when we came back last week. You know?

(264) Me: Yes, that is an issue that we are always going to have because of the numbers we have and the restricted number of placements. We can't give everybody all the skills before going to each placement. That would be the ideal world but unfortunately that's not the way it works. However there is no reason why you can't be taught skills that you haven't been taught here while out in practice. You know, you can say well 'I've never done that before but I'm willing to learn', you get someone to show you, you know? But yea, I know what you're saying. That is difficult.

(265)Me: Ok. So to try and close down a bit. Overall then, how valuable would you say that using self assessment has been to developing your competence in clinical skills. Do you think self assessment is a valuable thing to have for developing competence or not?

(266) S1: Yea. It gives you time to reflect kind of

(267) (Sounds of agreement from group)

(268) S9: Yea it makes you more aware.

(269) S3. Overall, I thought it was quite good.

(270) Me: Well actually, the questionnaire showed that a lot of people did feel that it helped them to remember the steps, and it gave them time to reflect but they weren't to sure about the patient communication aspect. I think it was hitting two components of competence *(Psychomotor and cognitive)* but not the third (*aesthetic*). The point that you came up with regarding that.

(271) Me: So would it be fair to say that it was valuable but could be more valuable if it was better focused?

(272) (Sounds of agreement from group)

(273) Me: Am I right?

(274) (Some sounds of agreement from group)

(275) Me: Ok then, what other comments would you like to make about your experience using the self assessment booklet that maybe we haven't touched on?

(276) Long pause

(277) Me: Is there anything else that someone would like to add?
(278) S7: No I think we've pretty much touched on everything.

(279) Me: Any one else?…anyone?
(280) Ok. Well can I just thank you all very much giving up your time and for actively participating in the focus group. It's very much appreciated. And also, If you don't mind, I may get back to you at a later stage to clarify my interpretations of the transcript. Thanks again for your time.

End (52 mins)

Appendix 14: Ethical Approval

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3rd June, 2009.

Mr. Brian Sharvin,
Department of Nursing,
WIT.

Dear Brian,

Thank you for bringing your project *'Student Nurses Clinical Skills Competence: The development of a self rating scale'* to the attention of WIT Research Ethics Committee. I am pleased to inform you that we are satisfied that you have considered all the ethical implications of your research and we approve WIT's participation in this project.

We wish you well in the work ahead.

Yours sincerely,

Venie Martin

Dr. Venie Martin,
Chairperson,
Research Ethics Committee.

cc: Dr. Julia Ibbotson

Appendix 15: Stages of the mixed-methods data analysis process.

Stages of Mixed Methods Data Analysis Process	
Stage	Methods used
1.Data Reduction	Descriptive statistics used for quantitative data generated from OSCE, practice based learning aid, researcher clinical assessment and evaluative questionnaire. Miles and Hubermann's (1994) method for analysing qualitative data from the written reflective comments and focus group
2. Data Display	Quantitative data: Frequency tables, bar graphs and charts. Qualitative data: Thematic charts, direct quotations and explanatory text.
3.Data Comparison	Comparing the data from all sources in the discussion chapter.
4.Data Integration	Integrating all data into a coherent whole in the form of a tentative model of competency learning and transition.

Appendix 16: Extrapolating categories from qualitative raw data

Categories	Prerequisites to learning	Factors conducive to learning	Factors non-conducive to learning	Promotional learning
Subcategories	Intrinsic Motivation Self concept	Learning Opportunity Memory Aid Self assessment through reflection Repetition Embedded learning	Environmental Factors Personal factors Inter-Personal factors	Skills Training Skills Assessment

Category 1 Prerequisites to learning (Adult learner)

Sub Category	Motivation (Intrinsic)	FG Quote No	Self-Concept	FG Quote No
Codes	Keen to Learn	49-53	Feeling confident	236, 238,
	Seeking experience	52	Feeling Competent	224
	Not wanting to hold back	53	Level of preparation	65, 209
	Self-Expectation	58-63	Prior experience	236
	Keen to Impress Staff	229		
	Social Acceptance into 'real' world of nursing	231		

Sub-Category	Learning Opportunity	F.G. Quote No	Memory Aid	F.G. Quote No	RC Quote No	Self-Assessment through Reflection	F.G. Quote No	RC Quote No	Repetition	F.G. Quote No	RC Quote No	Embedded learning	F.G. Quote No	RC Quote No
Codes	Nature of clinical placement	116-121	Increased awareness & reminder of the skill	12, 217	66-67	Time out to review experience	266-7	99	Repeat performance	105, 192-198	20, 21, 83	Competence achieved (Conscious competence)	166, 200	04, 22, 23, 24, 27, 35,37, 38, 46, 49, 75, 76, 80, 81, 89, 90, 92, 97 19, 59, 62, 117
	Ability to practice skills	122-127 175-176	Reminder of the 'Steps' of the skill	4-8, 36-38, 179	01, 02, 28,29, 43, 47, 52, 64, 69,70, 102, 103, 107, 109, 110, 113, 114, 118, 121, 140, 141, 144, 145, 148, 149	Thinking about steps during task	38, 213	14	Practice improves performance	200, 203	06, 07, 47, 48, 49,50, 63, 68, 71, 80, 95.	Knowing how to do it	29,	
	Relevance to skills training	173, 244	Stimulus to learn	12-15		Focus on the task Thinking about steps after task	35, 220	05, 25, 36, 39, 51, 57,74, 77,91, 104, 119, 142, 145-47	Sense of revision	181		Steps imprinted (Unconscious competence)	38, 182-185	
						Checking the process completed correctly	40, 53,	08,18, 26, 56,65, 78, 79, 10, 105, 111,115, 116, 120, 126,129, 150-151						9, 10, 11, 41, 48, 50, 60, 61
						Grading performance	204-211	03, 17, 31, 32, 33, 42, 44, 54, 82, 84, 87, 93, 98, 106, 127, 130, 133, 136-139.						

Category 2: Factors Conducive to Learning

Sub Category	Environmental factors	F.G. Quote No	RC Quote No	Personal factors	F.G. Quote No	RC Quote No	Inter personal	F.G. Quote No
Codes	Time constraints	35	40, 45, 53, 96, 123, 124	Low self confidence	49, 146-174, 234, 263	30	Preceptors' previous experience	259
	Practicality of using booklet	40, 117, 186-191		Fear of embarrassment/ ridicule	45		Preceptors' expectations	48, 55-58, 62-63, 78, 144-145, 227-229
	Lack of equipment	156	16, 128, 134, 135	Feeling unprepared	144-145 168-169			
	Learning Opportunity not available	12, 49, 82-89, 101-110,	12, 13, 58, 85, 86, 88, 108, 112					
	Other career providing skill (e.g. parent for child)	113-115, 79		Time lapse since training/OSCE	36, 69-73, 237, 240-243			
	Complexity of task							

Category 3 Factors Non-Conducive to Learning

Sub Category	Skills Training	Quote No	Skills Assessment	Quote No
Codes	Appropriate to Clinical Placement	84, 88, 91, 95, 175-176, 245-249	Continued use of OSCE	65-67
			Self Assessment Training	204-211
		97,98	Self Assessment tool • Include more skills • User Friendly	143, 252 189-191
	Psychomotor skills			
	Interpersonal Skills	217-218 250, 252 257		
	Regular updates	69-70 73, 182		

Category 4 Promotional Learning Concept

Appendix 17: Transcript of Student's key reflective comments

FC = Fully Competent; C = Competent; PC = Partially Competent; NC = Not Competent.

Quote No: Student I.D. Skill code

R**S1**

HW1: " I am unsure weather I remembered to interlace my fingers while washing my hands"(PC)

UR 1 " make sure to hold strip evenly or place on level surface to prevent run off causing contraindications."(C)

UR2 " Performed better than previous, corrected mistakes" (FC)

RS 2

HW 1 " I felt that I was quite competent in this area" (N.B. only did 1 assessment)(FC)

BP 1 " I never prepared and cleaned the equipment previous to use and I released the valve to quickly for reading"(PC)]

BP2 " Although I managed to get the required steps I still don't feel as competent as I should" (only did 2 assessments of this skill (C))

UR1 "I felt quite competent in this skill as I had practiced and looked over the steps previous to doing it"(FC)

Quote No: Student ID: Skill code

RS3

HW 1 " Did not use elbow to use pump soap dispenser, just used hand." (C)

HW 2 " Fully happy with performance" (FC)

HW3 " Happy with performance" (FC)

HW4 "Content with performance" (FC)

IM1 " Did not need to draw up medication as it was previously drawn up. Happy with performance" (FC)

UR 1, 2, 3 and 4 " I did not introduce myself as I did the urinalysis in the sluice room for a staff nurse (C)

Neb 1 “I did not offer a face cloth to the patient and did not inform the patient about peak flow as he was a known Asthma patient (C)

Neb 2 “ I did not inform the patient about the call bell as relative (mother) familiar with neb was present. I forgot to offer face cloth as patients mother present to help and peak flow was not indicated” (PC)

RS4

HW 1 “The Water was not very hot, didn’t enquire if this was always the case” (C)

HW2 “ I forgot to rub tips against palms. Felt it was better than last one” (C)

HW 3 “ Overall I felt I completed this skill correctly. I did follow the signs beside the sink but there is no fault in that” (FC)

BP 1 “ I Checked the BP but the result seemed a bit too high for the patient 150/90 PHN rechecked and got 140/70.” (PC)

Quote No: Student ID: Skill code

BP 2 “ Found it hard to locate the brachial artery. After a few times I found pulse and got a reading of 130/75. PHN re-checked it and correct. (C)

BP3 “Performed manual B/P on a minor in the paediatric ward. Found the pulse and the nurse in charge verified the B/P was correct” (FC)

UR1 “found that I was able to perform this task very well” (FC)

UR 2 “I performed this task well. I was able to confirm leucoytes present which is important in pregnancy” (FC)

24. Ur 3 “ The patient had a urinary catheter . Sample taken from tubing” (FC)

Neb 1 “Call bell, mouth wash, peak flow not mentioned. I would think the important things were done properly and competently ” (PC)

RS5

HW1 “ In reflecting on my handwashing performance I realised that I forgot to remove my wrist watch” (FC).

HW2 “ I felt more confident today and did not forget any steps in the handwashing performance”(FC)

HW3 " When a student is away from the clinical area it is easy to forget some critical elements. I feel competent now as I am back in the clinical area"(FC)

HW4 " I feel handwashing is a skill most needed in the clinical area with the vast rise in hospital acquired infections. I am competent in this skill, I feel" (score FC).

BP 1 " I was doing this B/P in the clients home while on public health placement and felt nervous. I forgot to tell the client about pressure on the arm" (C)

Quote No: Student ID: Skill code

BP 2 " I feel I performed this skill quite well. The client was not in a comfortable position due to the fact that she was in labour" (FC)

BP 3 "performed well" (FC)

BP 4 " performed well" (FC)

IM1 " I feel I carried out this skill competently and did not forget any of the critical elements" (c)

IM2 " I forgot to explain the procedure to the client and check his ID but my preceptor was with me and reminded me" (C)

IM3 " I feel I carried out the IM injection with competence and confidence (FC)"

IM 4 " Performed well. I did not forget any critical elements"(FC)

UR1 " I feel I performed the urinalysis skill well. I did wash my hands as per SARI guidelines but after the skill was performed not before. (FC)

UR 2 " I forgot to wash my hands again because I was so busy" (FC)

Ur 3 " did not forget any critical elements" (FC)

UR4 " performed well".(FC)

Neb 1 " Forgot to check expiry date" (C)

Neb 2 Performed well"(FC)

Neb 3 "Forgot to inform the patient how long the solution would take as I was very busy"(FC)

Neb 4 Performed competently, I felt"(FC)

Quote No: Student ID: Skill code

RS6

HW 1 " I didn't pump with my elbow" (C)

HW2 " Didn't omit any steps" (FC)

HW3 " Fully competent in this skills" FC)

HW4 " Fully competent, no steps omitted. FC)

MC 1 " I forgot to offer mouthwash to the patient. As they didn't have dentures, I did not have to include this step (C)

BP 1 " I didn't put the cuff so centre of bladder was over brachial artery, and I pumped cuff to 25mmhg" PC)

BP 2 " I didn't clean away equipment straight away as I was called to do another task" (C)

BP 3 " I believe I did it correctly" (FC)

BP 4 "Gained complete competence of this skill" (FC)

IM 1 " I didn't use the dorso-gluteal injection site"(C)

UR 1 " Did all steps" (FC)

Ur 2 "I didn't discuss with patient as it was only a child" (c)

RS8

HW 1 " Fully competent as this skill is done several times in a day. It is the most practiced skill" (FC)

HW 2 "Fully competent in handwashing. Most used skill"(FC)

HW 3 " Fully competent again as it is done so many times during the day" (FC)

Quote No: Student ID: Skill code

BP 1 " Fully competent as it is a skill I learned to perfect in theory" (FC)

IM 1 " Felt very confident doing this skill as I've had loads of practice. Did all the steps correctly" (PC)

RS10

HW 1 “I didn’t use enough soap for a lather” (FC)

HW2 , HW 3 and HW 4 :“ All steps completed”).(FC)

MC 1 “ I would give myself more time to think about the task”(C)

MC2 “ Would read over the steps involved before commencing” (C)

MC 3 and MC 4 “ With practice, I completed all the steps” (FC)

BP 1 “I’d remove tight clothing instead of rolling up sleeves” (C)

BP 2 “ Always remember to wash hands before and after task” C)

BP 3 “With practice I completed all steps competently” (FC)

BP 4 “ I completed all steps competently” (FC)

IM 1 “I completed all steps competently”(FC)

IM 2 “ I forgot to wash my hands after the skill” (FC)

Ur 1 “I completed all steps competently” (FC)

UR2 “ I completed all steps competently”(FC)

UR 3 “Always remember to wash hands after each task” (c)

Quote No: Student ID: Skill code

Neb 1 “ Forgot to check expiry date”(C)

Neb 2 “I forgot to tell the patients that a peak flow measurement may be required” .(C)

Neb 3 “With practice all the steps were completed competently’ .(FC)

RS11

Hw 1 “I feel I am fully competent in this skill” (FC)

BP 1 “As machines are usually used, I forgot to check manual radial Pulse”(PC)

BP 2 “I decided to do all the BP’s manually in order to get more comfortable at it”(PC)

IM 1 “ On Reflection I was very pleased with my performance”(FC)

UR 1 “ As the sample was obtained already All I had to do was test the sample”(C)

Neb 1 “ As the nebuliser was already co-signed by nurses I just had to deal with putting it on the patient”(PC)

RS13

BP 1 “Found it hard to hear the brachial artery” (C)

Ur 1 “Used urinalysis machine to get reading” (FC)

RS15

Quote No: Student ID: Skill code

HW 1 “ felt competent that i performed all the steps.” (C)

HW2 “felt fully competent”(FC)

MC 1 “ I didn’t do all the steps”(PC)

IM 1 “Felt competent in doing this skills”(C)

UR1 “I asked for the urine sample but did not say (to the patient) what I was doing with it” (NC)

Neb 1. ”I left out some steps in this skill, did not feel fully competent”(PC)

Neb 2 “After practice I felt competent in doing this skill”(FC)

RS18

HW1 “During this handwash i left out a few of the steps. I felt rushed and didn’t spend enough time on this procedure” In future I will ensure to include all the steps for an effective handwash” (PC)

.HW2 I completed this handwash as per SARI guidelines. I feel competent in this skill” (FC)

BP 1 “In reflection, i forgot to clean the equipment before using it on the patient, In future I will pay more attention to my aseptic technique. I also forgot to ensure the patient was comfortable before leaving the bedside.” (NC)

BP2 “ On my placement i only did one manual blood pressure. In reflection, i should have tried to do more manual BP’s on placement rather than electronic

BP. I feel competent with electronic BP's. In my next placement I will do more manual BP's."(PC)

Quote No: Student ID: Skill code

IM1 " I forgot to check the prescription sheet to ensure it was not already given. In future i will ensure to do this and check expiry dates on all devices used." (NC)

IM2 "During this IM I failed to ensure patient dignity and introduce myself to the patient. In future I will communicate more with the patient."(PC)

IM 3 "Before this IM I had the chance to look over my assessment book so I could ensure not to leave out any steps. (C)

Ur 1 I forgot to check the expiry date on the reagent strips" (PC)

Ur 2 " I feel I didn't explain the procedure to the patient effectively. I am now more aware of the importance of good communication" (PC)

UR 3 " I was happy with my performance in this skill" (FC)

Neb 1 " I didn't perform this skill adequately and feel i need to research this topic more" (PC)

RS19

IM 1 " Did not advise patient to exercise" (c)

108. UR1 " Was given sample by nurse to check. Used machine so had print out of results" (c)

RS20

HW 1 " I did relatively well but rubbed back of hands first" (c)

HW2 " I didn't remove my ring and roll up my sleeves" (c)

HW 3 " Had to use hand to get soap, Didn't rub palm to palm". (c)

HW 4 " I felt that I completed the skills properly" (FC).

BP1 "Didn't locate radial pulse. Omitted steps related to this" (NC)

BP2 "Didn't locate radial pulse" (PC)

BP3 " I completed the task relatively well but didn't locate radial pulse"(C)

IM 1 “ I completed this skill well” (FC)

UR 1 “ Correctly performed this procedure” (FC)

UR2 “Omitted time interval” (PC)

Neb 1 “Overall my performance was ok but I omitted a couple of steps” (C).

RS21

120 BP 1 “ I should have told the patient to rest their hand while I was taking the blood pressure instead of him holding it up” (C).

IM 2 “ I forgot to draw back the injection to check for blood” (PC)

122. IM4 “ My preceptor signed the medication sheet as I was called away” (C)

Ur 1 I didn’t explain the procedure to the patient as i was just handed the sample to test” (C)

Quote No: Student ID: Skill code

UR 4 I got called away before I could finish it so my preceptor recorded the results” (PC)

RS22

HW 1 “ I feel fully competent at handwashing as it is the most important aspect of nursing care. It is the most practiced skill” (FC)

IM 1 I forgot to aspirate when administering the IM “ (PC).

127. IM2 I felt more competent the second time as i had my clinical skills booklet as a guide” (C).

UR 1 “ I was unsure where to dispose of the waste correctly” (C).

RS25

HW 1 “ I forgot to wet my hands thoroughly before using the soap” (C)

RS26

HW 1 " I did not check the temperature of the water just because I was confident that it was luke warm. In case it is too hot, I will check it the next time" (C)

HW 2 " I feel that I completed this action as instructed because I was aware of the mistake that I made last time" (FC).

HW3 " I feel confident that I can complete all of the steps because I have to do it so many times in the day" (FC)

HW 4 "I was concentrating too much on another skill that I foolishly did not perform this to the highest standard" (PC).

BP 1 " I did not clean the equipment before hand. I assumed that the nurse before hand done so. I should not assume just in case. "(C).

BP2 " I did not clean the equipment beforehand because i could not find any cleaning equipment. On reflection I realise that I should have asked a staff nurse " (C)

UR 1 " I forgot to check the expiry date. I will remember next time as it is very crucial. I did not introduce myself as the samples were already left at reception" (C).

UR 2 " I forgot to check the strip which was a messy mistake. I feel that I should have remembered to do so for it is so simple yet vital" (PC)

UR 3 " I forgot to check the expiry date. I will remember next time for i know that the procedure is pointless if out of date" (C)

UR 4 " I was happy with my performance. I feel comfortable with the steps because i have done them so many times " (FC)

RS27

HW 3 "I failed to clean finger interlaces" (C)

HW4 " I failed to clean both thumbs" (C).

MC 1 " Oral assessment was not taken. I assessed the patients oral condition after my preceptors instruction " (PC)

143. BP 1 " I Loosened the valve too fast. I re-inflated the valve and re-checked again" (pc).

BP 2 " I failed to clean equipment prior to the procedure" (C)

IM 1 " I failed to advise the patient to move the limb for checking any side effects by the IM. My preceptor checked the patients limb movements" (C)

IM 2 "Needle is not changed and i changed after the preceptor reminded me " (C)

IM3 " Curtain was not closed properly. I closed the curtain fully". (C)

Ur 1 " The date of the strips was not checked. I'll check expiry date of strips next time" (C).

UR 2 " I failed to wait for the required time when reading the result. I did it again in order to obtain the exact result" (C)

Neb 1 " Failed to introduce myself before the procedure. I turned the meter to 10 Litres per second" (PC).

Neb 2 " Face mask was not fitting properly" (C)

Appendix 18: Figures showing frequency for baseline competency scores in the OSCE

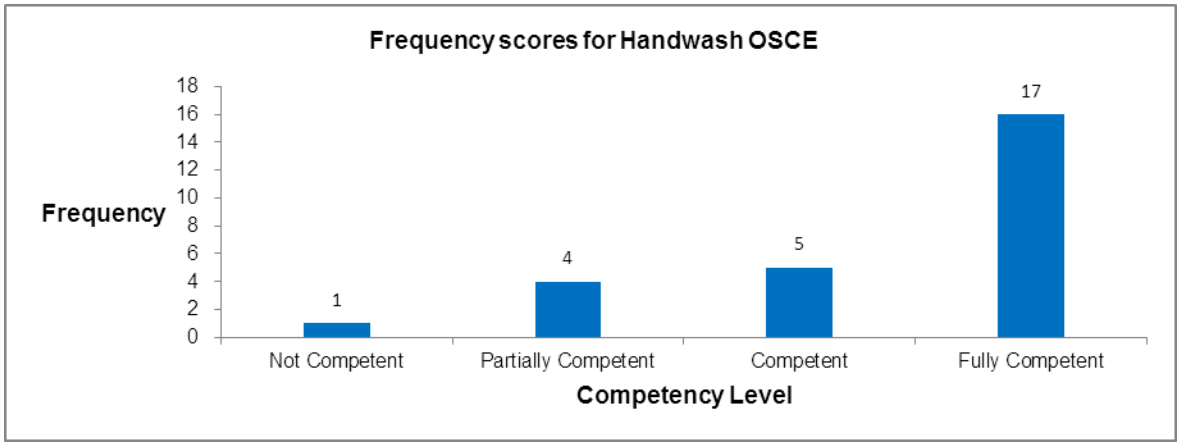


Figure 1: Bar chart showing frequency of competence levels for the hand wash OSCE

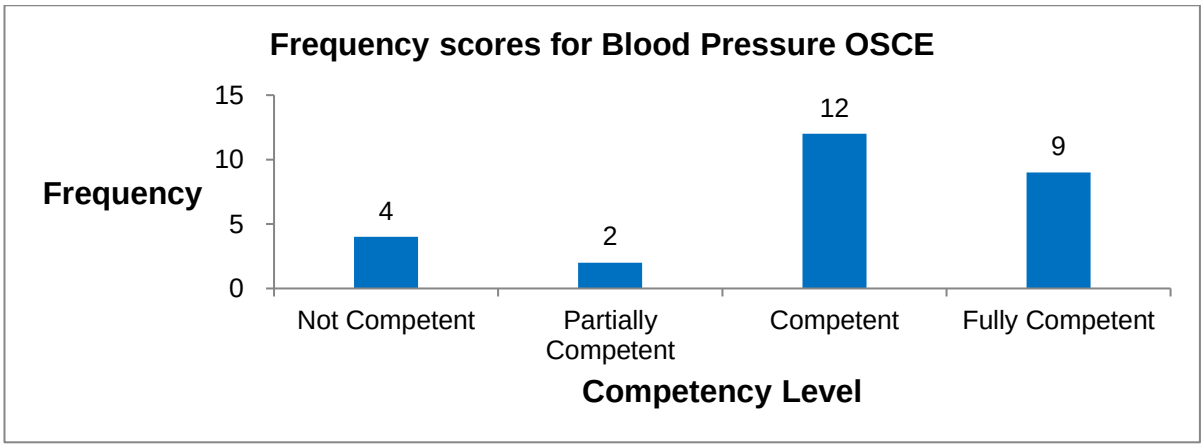


Figure 2: Bar chart showing frequency of competency level for the Blood Pressure recording OSCE

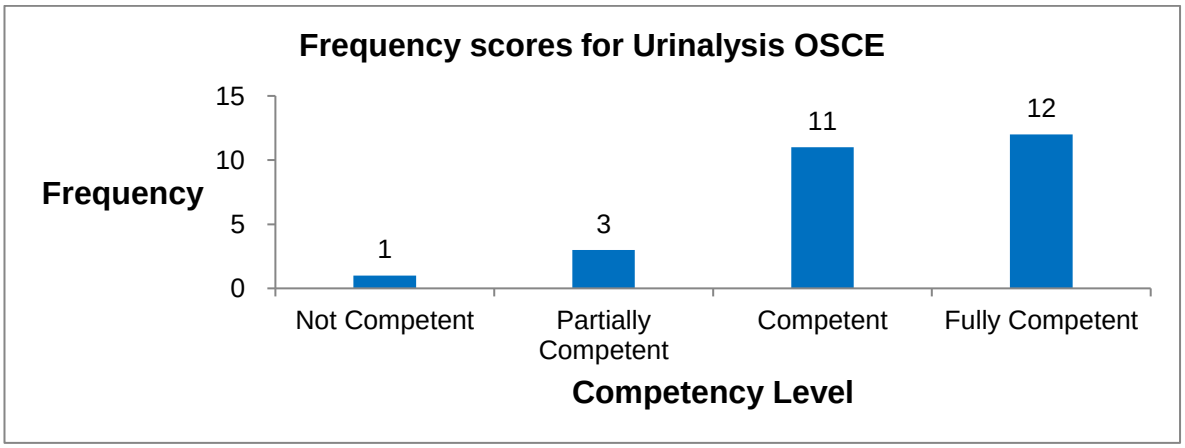


Figure 3: Bar chart showing frequency of competence levels for the urinalysis OSCE

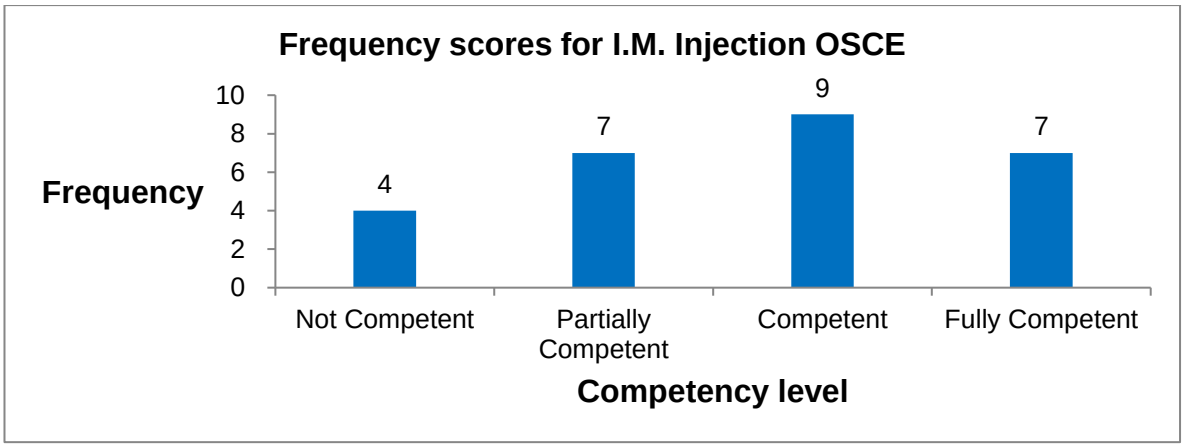


Figure 4: Bar Chart showing frequency for competency level for the IM injection OSCE

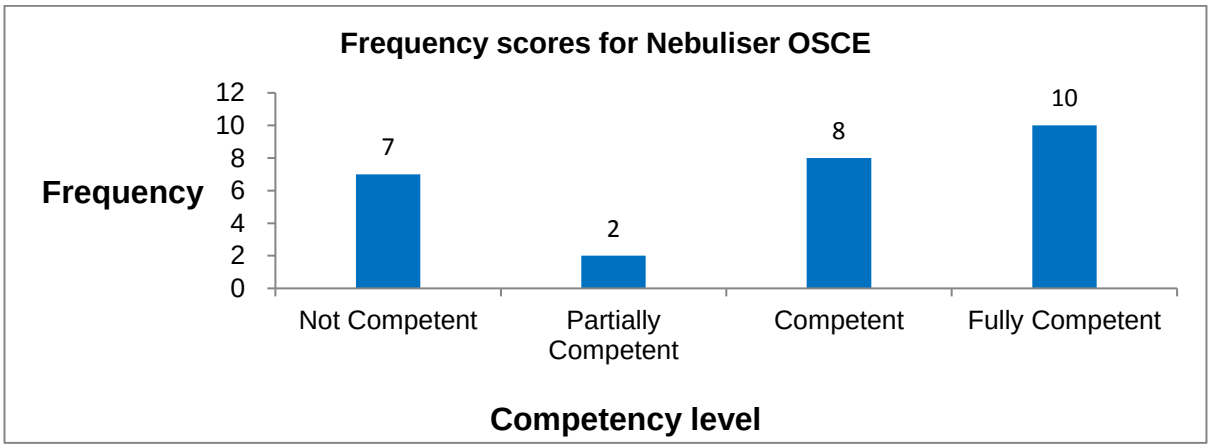


Figure 5: Bar Chart showing frequency of competence grades for the administration of a nebuliser OSCE

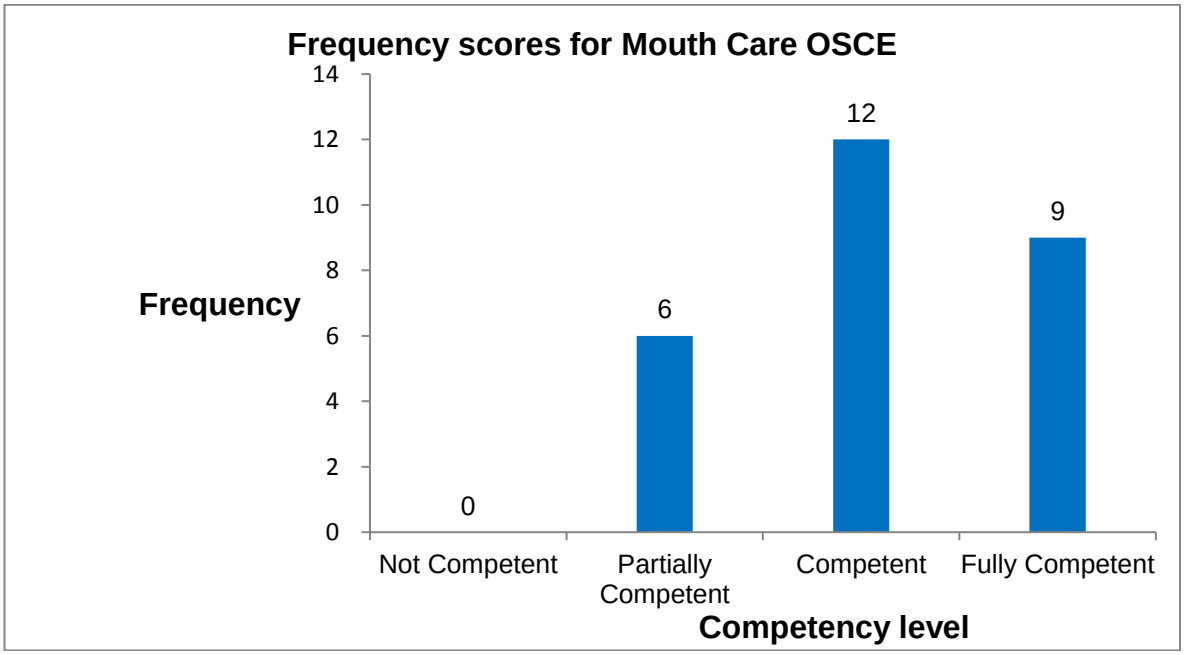


Figure 6: Bar Chart showing frequency of competency level for the mouth care OSCE

Appendix 19 Tables for the First Competency levels recorded using the RCCSC during clinical placement

***The shaded diagonal in the tables indicates where competency levels recorded at both stages were the same. Scores above the shaded diagonal indicates where there was an improvement in the competency level. Scores below indicate a disimprovement in the competency level. This principle applies to all tables.**

		Hand Wash: first RCCSC competency level				
Hand Wash OSCE competency level		NC	PC	C	FC	Total
	NC	0	0	0	1	1
	PC	0	0	2	1	3
	C	0	2	2	1	5
	FC	0	0	5	8	13
Total		0	2	9	11	n=22

Table 1: Comparison of the OSCE competency level and the first RCCSC competency level for the skill of hand washing.

		Blood Pressure Recording First RCCSC competency levels				
Blood Pressure Recording OSCE competency levels		NC	PC	C	FC	Total
	NC	1	0	2	0	3
	PC	0	0	1	0	1
	C	0	3	3	2	8
	FC	1	2	2	2	7
Total		2	5	8	4	19

Table 2: Table comparing the OSCE competency level and the first RCCSC competency level for the skill of blood pressure recording

		Mouth Care First RCCSC competency levels				
Mouth Care OSCE competency levels		NC	PC	C	FC	Total
	NC	0	0	0	0	0
	PC	0	0	0	0	0
	C	0	2	2	0	4
	FC	0	0	0	0	0
Total		0	2	2	0	4

Table 3: Comparison of the OSCE competency levels and the first RCCSC competency levels for the skill of mouth care

		IM Injection First RCCSC Level				
IM Injection OSCE level		NC	PC	C	FC	Total
	NC	0	1	0	2	3
	PC	0	0	2	1	3
	C	0	1	2	4	7
	FC	1	0	2	1	4
Total		1	2	6	8	17

Table 4: Comparison of the OSCE scores and the first RCCSC Competency Level for the skill of IM injection

		Urinalysis First RCCSC Level				
Urinalysis OSCE Level		NC	PC	C	FC	Total
	NC	0	0	0	1	1
	PC	0	0	1	2	3
	C	0	1	5	2	8
	FC	1	0	2	6	9
Total		1	1	8	11	21

Table 5: Comparison of the OSCE Level and the first RCCSC Level for urinalysis

		Nebuliser First RCCSC Level				
Nebuliser OSCE Level		NC	PC	C	FC	Total
	NC	0	1	1	0	2
	PC	0	1	0	0	1
	C	0	1	2	0	3
	FC	0	2	1	1	4
Total		0	5	4	1	10

Table 6: Comparison of the OSCE competency level and the first RCCSC levels for administration of a nebuliser

Appendix 20 Tables comparing Max competency levels recorded in the RCCSC with competency levels recorded during the OSCE.

Table 1: Student competency levels for each of the six clinical skills from the OSCE, the first RCCSC and the Max RCCSC

	OSCE competency levels				Total	First RCCSC competency levels				Total	Max RCCSC competency levels				Total
	Not Competent	Partially Competent	Competent	Fully competent	100 %	Not Competent	Partially Competent	Competent	Fully competent	100%	Not Competent	Partially Competent	Competent	Fully competent	
Hand washing	1	3	4	13	22	0	2	9	11	22	0	0	2	20	22
Blood pressure	3	1	8	7	19	2	5	8	4	19	1	0	6	12	19
Urinalysis	1	3	8	9	21	1	1	8	11	21	1	0	3	17	21
IM Injection	3	3	7	4	17	1	2	6	8	17	0	1	6	10	17
Nebuliser	2	1	3	4	10	0	5	4	1	10	0	3	1	6	10
Mouth care	0	0	4	0	4	0	2	2	0	4	0	2	1	1	4

		Hand Wash Max RCCSC competency level				
Hand Wash OSCE competency level		NC	PC	C	FC	Total
	NC	0	0	0	1	1
	PC	0	0	0	3	3
	C	0	0	1	4	5
	FC	0	0	1	12	13
Total		0	0	2	20	22

Table 2: Comparison of the OSCE and the Max RCCSC for hand washing

		Blood Pressure Recording Max RCCSC				
Blood Pressure Recording OSCE		NC	PC	C	FC	Total
	NC	0	0	2	1	3
	PC	0	0	0	1	1
	C	0	0	4	4	8
	FC	1	0	0	6	7
Total		1	0	6	12	19

Table 3: Comparing the OSCE and the Max RCCSC for blood pressure recording

		Mouth Care Max RCCSC level				
Mouth Care OSCE level		NC	PC	C	FC	Total
	NC	0	0	0	0	0
	PC	0	0	0	0	0
	C	0	2	1	1	4
	FC	0	0	0	0	0
Total			2	1	1	4

Table 4: Comparing the OSCE and the Max RCCSC competency levels for the skill of mouth care

		IM Injection Max RCCSC level				
IM Injection OSCE level		NC	PC	C	FC	Total
	NC	0	0	1	2	3
	PC	0	0	1	2	3
	C	0	0	1	5	7
	FC	0	0	3	1	4
Total		0	1	6	10	17

Table 5: Comparison between the OSCE and the Max RCCSC competency levels for the skill of IM Injection.

		Urinalysis Max RCCSC level				
Urinalysis OSCE level		NC	PC	C	FC	Total
	NC	0	0	0	1	1
	PC	0	0	0	3	3
	C	0	0	2	6	8
	FC	1	0	1	7	9
Total		1	0	3	17	21

Table 6: Comparison of the OSCE and the Max RCCSC competency level for the skill of urinalysis

		Nebuliser Max RCCSC level				
Nebuliser OSCE level		NC	PC	C	FC	Total
	NC	0	1	0	1	2
	PC	0	1	0	0	1
	C	0	1	0	2	3
	FC	0	0	1	3	4
Total		0	3	1	6	10

Table 7: Comparison of OSCE scores and the Max RCCSC score for the skill of administering a nebuliser

Appendix 21: Tables showing recorded competency levels for the clinical skills observed during clinical placement and comparisons with other recorded competency levels.

		Researcher's Field Observation level for the Skill of Hand Washing				
Students' Self-Assessment level for the Observed Skill of Hand Washing		NC	PC	C	FC	Total
	NC	0	0	0	0	0
	PC	0	0	0	1	1
	C	0	0	2	5	7
	FC	0	0	1	13	19
Total		0	0	3	19	22

Table 1: Comparing the researcher's observed competency level with students' observed self-assessment level for the skill of hand washing

		Researcher's Field Observation level for the Skill of Urinalysis				
Students' Self-Assessment level for the Observed Skill of Urinalysis		NC	PC	C	FC	Total
	NC	0	0	0	0	0
	PC	0	2	0	0	2
	C	0	0	3	3	6
	FC	0	0	1	4	5
Total		0	2	4	7	13

Table 2: A comparison of the researcher's observed competency level with student observed self-assessment level for the skill of urinalysis

		Researcher's Field Observation level for the skill of Blood Pressure Recording				
Students' Self-Assessment level for the Observed Skill of Blood Pressure Recording		NC	PC	C	FC	Total
	NC	0	0	0	0	0
	PC	0	0	2	0	2
	C	0	1	2	1	4
	FC	0	0	1	1	2
Total		0	1	5	2	8

Table 3: Cross-tabulation of observed competency level with student observed self-assessment level for the skill of blood pressure recording

		Students' self-recorded level for the observed skill of Hand Washing				
		NC	PC	C	FC	Total
Hand Washing Max level	NC	0	0	0	0	0
	PC	0	0	0	0	0
	C	0	0	0	2	2
	FC	0	1	6	10	17
Total		0	1	6	12	19

Table 4: Cross-tabulation comparing the hand washing Max level using the RCCSC with the student self-recorded level when being observed

		Students' self-assessment score for the observed skill of B/P				
		NC	PC	C	FC	Total
Blood Pressure Max Score	NC	0	0	0	0	0
	PC	0	0	0	0	0
	C	0	1	1	0	2
	FC	0	0	3	2	5
Total		0	1	4	2	7

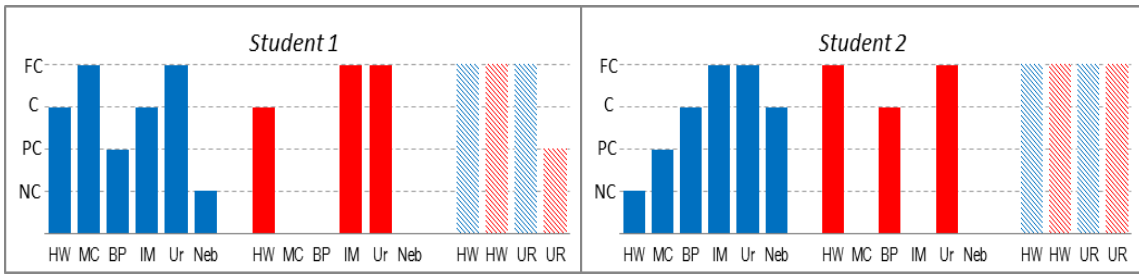
Table 5: Cross-tabulation comparing the Max competency level using the RCCSC with the students' self-recorded level when being observed for the skill of blood pressure recording.

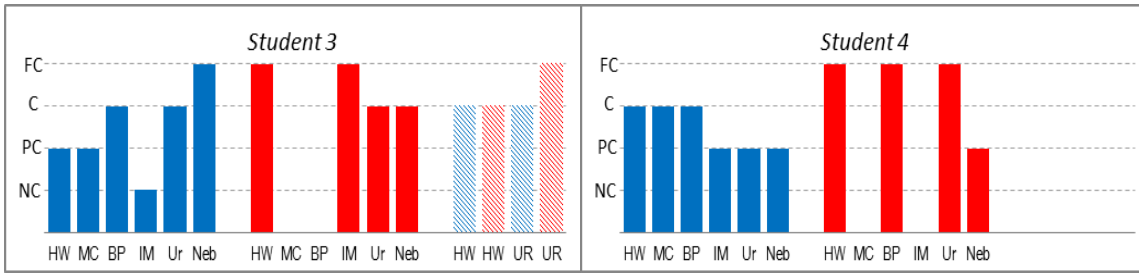
		Students' self-recorded level for the observed skill of urinalysis				
		NC	PC	C	FC	Total
Urinalysis Max level	NC	0	0	0	1	1
	PC	0	0	0	0	0
	C	0	0	3	0	3
	FC	0	1	3	3	7
Total		0	1	6	4	11

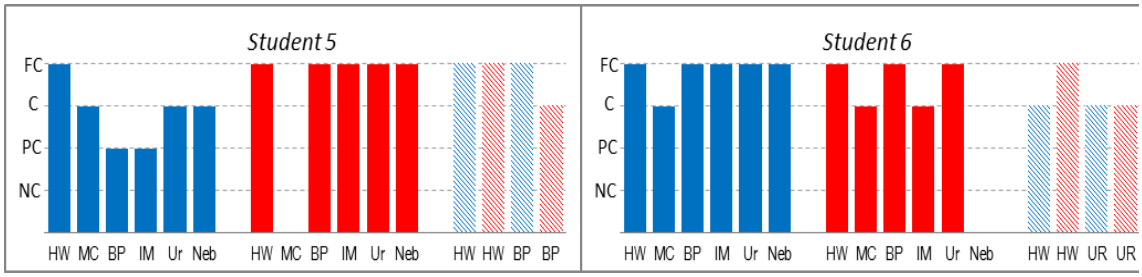
Table 6: Cross-tabulation comparing the Max competency level for urinalysis with the students' self-recorded level when being observed

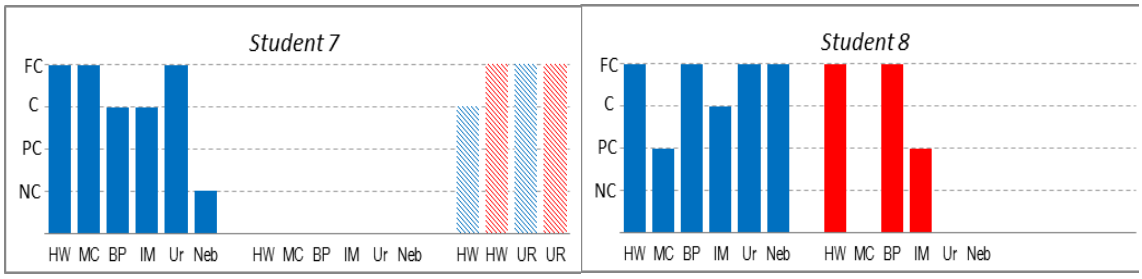
Appendix 22: A series of charts for all 27 student participants plotting competency levels at each phase of the study:

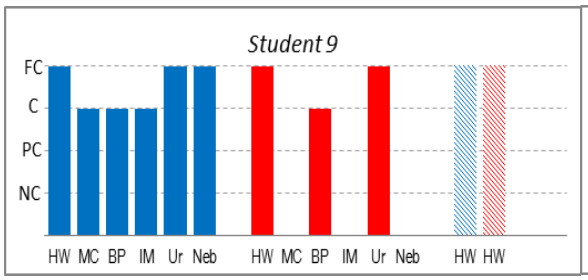
Each charts plots the students OSCE assessment (solid blue) and the max recorded competency level from clinical placement (solid red) in each of the six skills: hand washing (HW), mouth care (MC), blood pressure (BP), intramuscular injection (IM), urinalysis (UR) and administration of a nebuliser (NEB). Also plotted is the researcher's recording of the student for two observed skills (hashed blue) as well as the student's own recorded level of competency for these same observed skills (hashed red).







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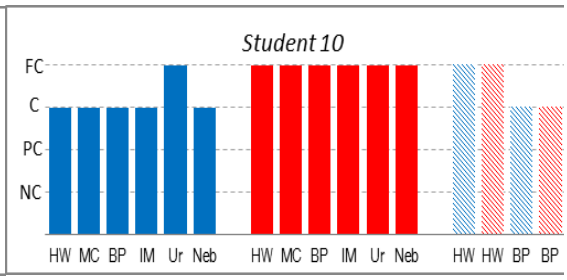
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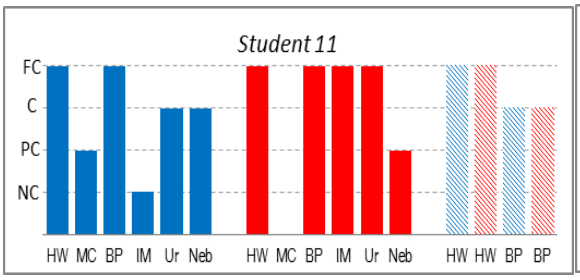
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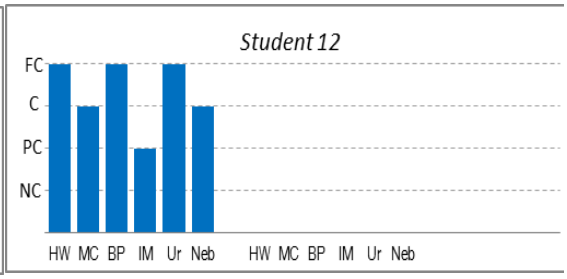
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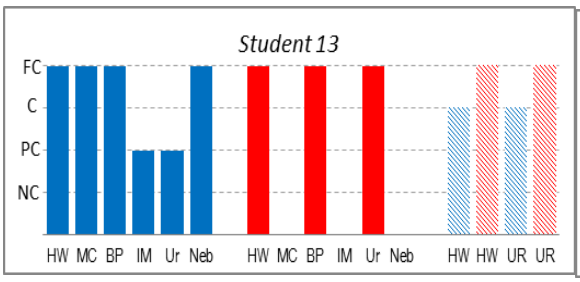
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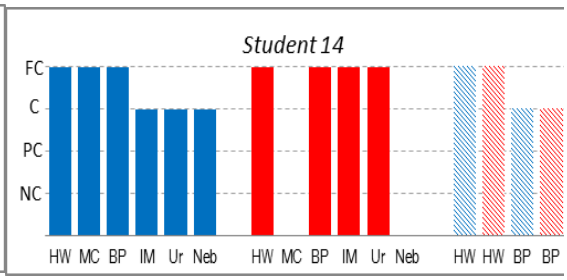
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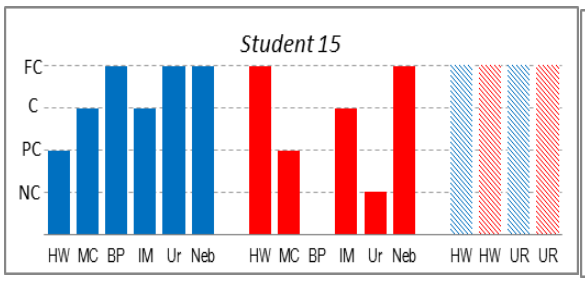
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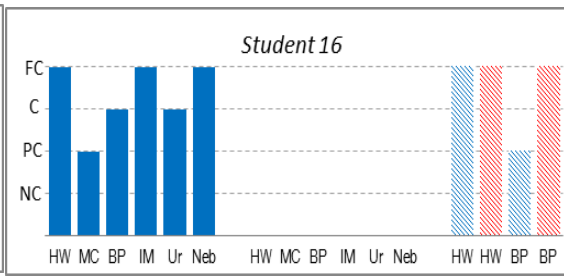
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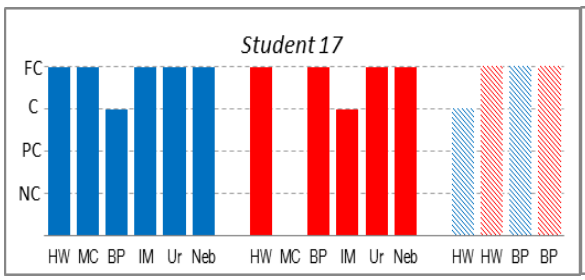
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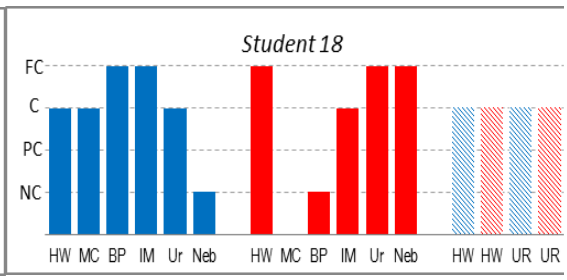
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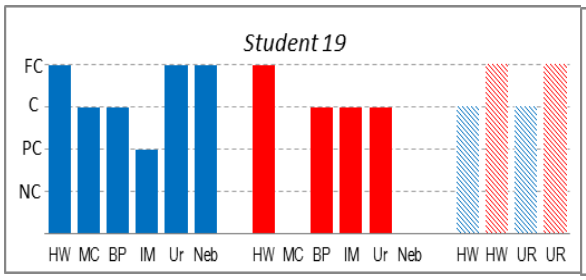
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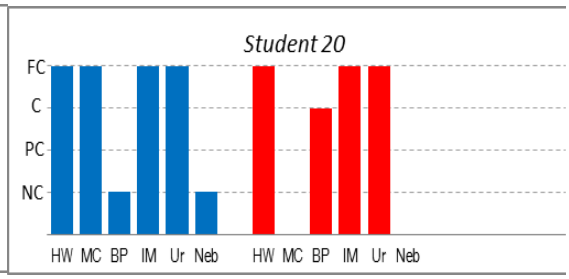
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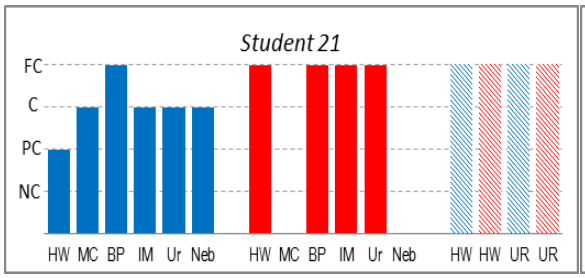
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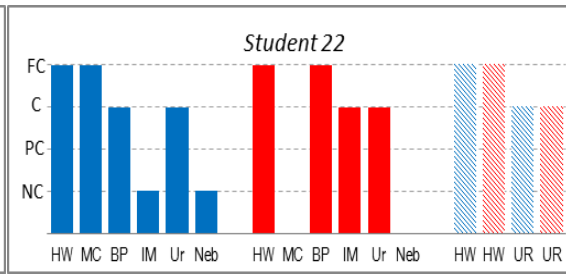
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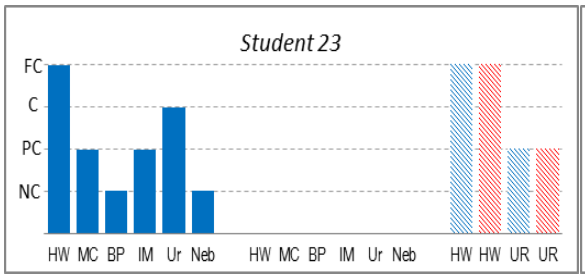
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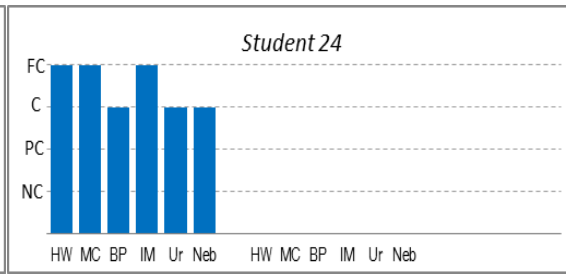
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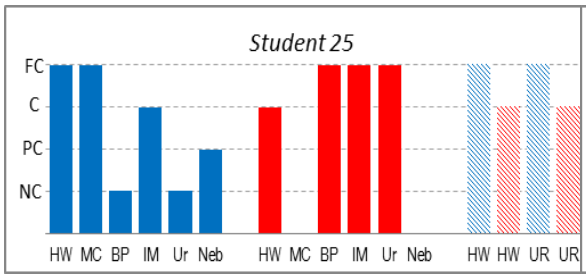
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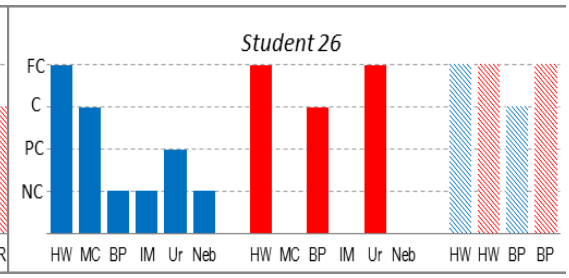
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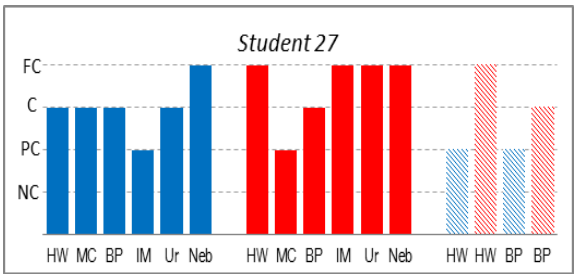
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Appendix 23: Table showing frequencies and relative percentage scores for the responses provided using a Likert scale for each of the evaluative statements

Evaluative Statement	Strongly Agree n (%)	Agree n (%)	Not Sure n (%)	Disagree n (%)	Strongly Disagree n (%)	Total (100%)
I was able to get an opportunity to perform the skills included in the RCCSC at least once during my placement	7 (26)	11 (43)	1 (4)	4 (15)	3 (12)	26
I found that using the RCCSC helped me to develop my Competence in performing clinical skills	9 (34)	15 (58)	2 (8)	0	0	26
I found that using the RCCSC helped me develop my knowledge about the skills I was performing	8 (30)	15 (58)	3 (12)	0	0	26
I found that using the RCCSC helped me to have a better understanding of the patients' experience when performing clinical skills.	4 (15)	12 (47)	9 (34)	1 (4)	0	26
I found that using the RCCSC helped me reflect (using Gibbs' cycle) on how I perform my clinical skills.	13 (49)	12 (47)	1 (4)	0	0	26
I found that using the RCCSC helped me to remember the sequence of steps for each of the clinical skills.	15 (58)	9 (34)	2 (8)	0	0	26
I think more skills should be added to the RCCSC	10 (38)	11 (42)	1 (4)	3 (12)	1 (4)	26
I think the RCCSC should be provided to all nursing students to help develop their competence	14 (54)	6 (23)	5 (19)	0	1 (4)	26

I found the RCCSC easy to use	14 (54)	9 (34)	2 (8)	1 (4)	0	26

Appendix 24 Figures providing a visual presentation of the themes, categories and sub-categories identified from the analysis of the focus group transcript.

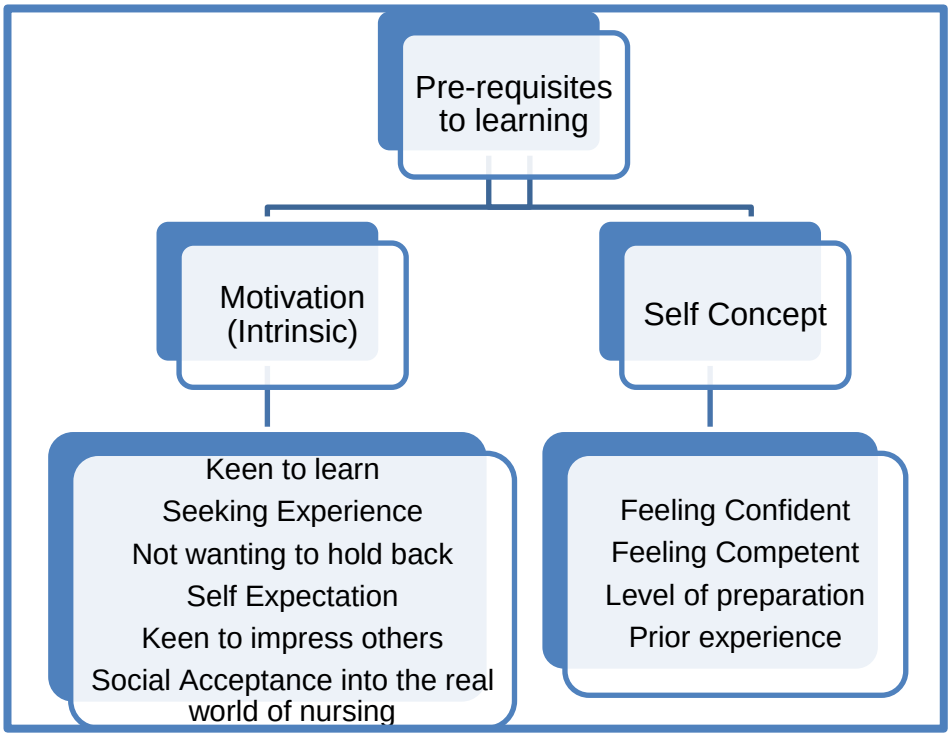


Figure 1: Theme 1 from the focus group: prerequisites for learning

Theme 2 from the focus group: conducive learning factors

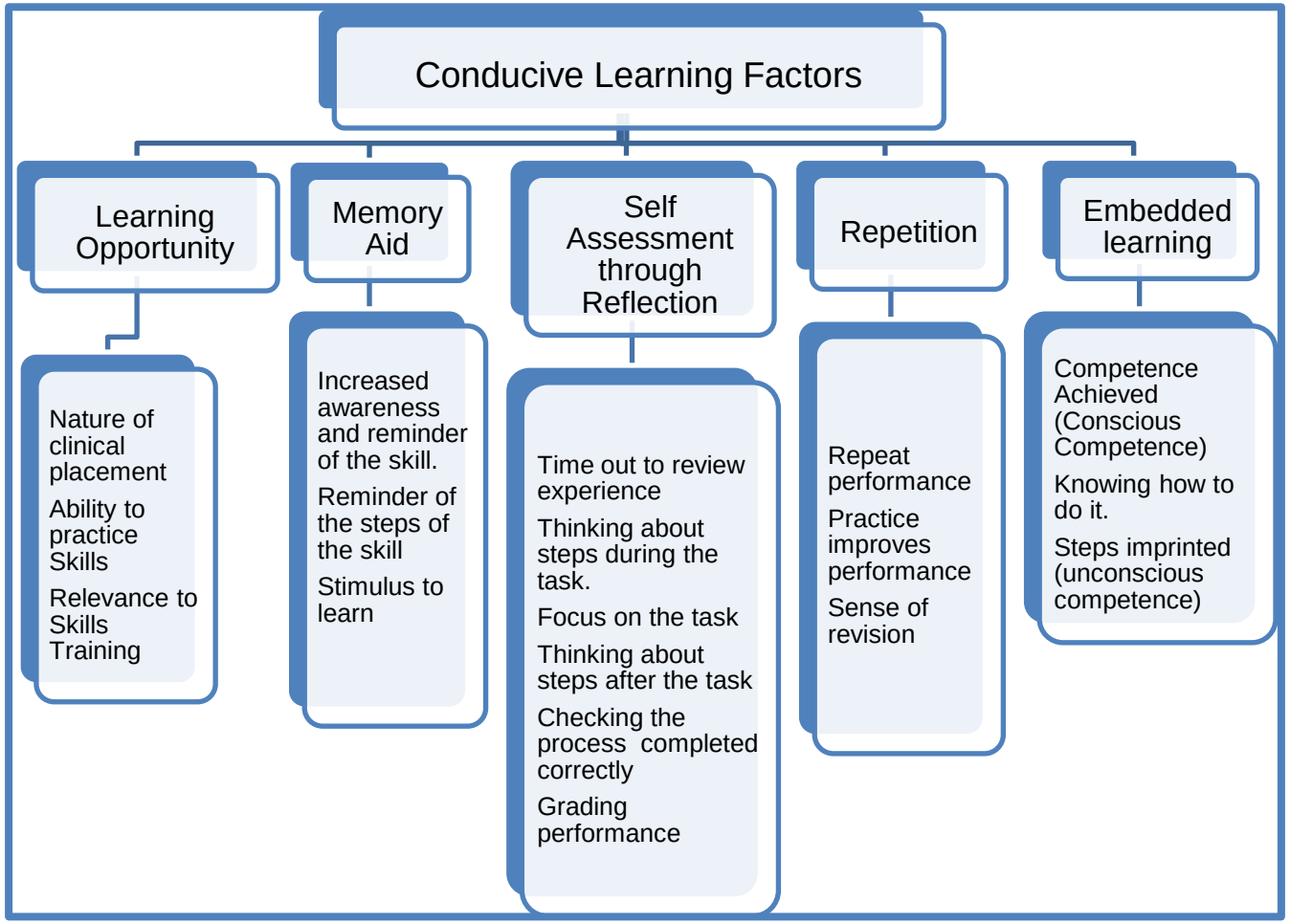
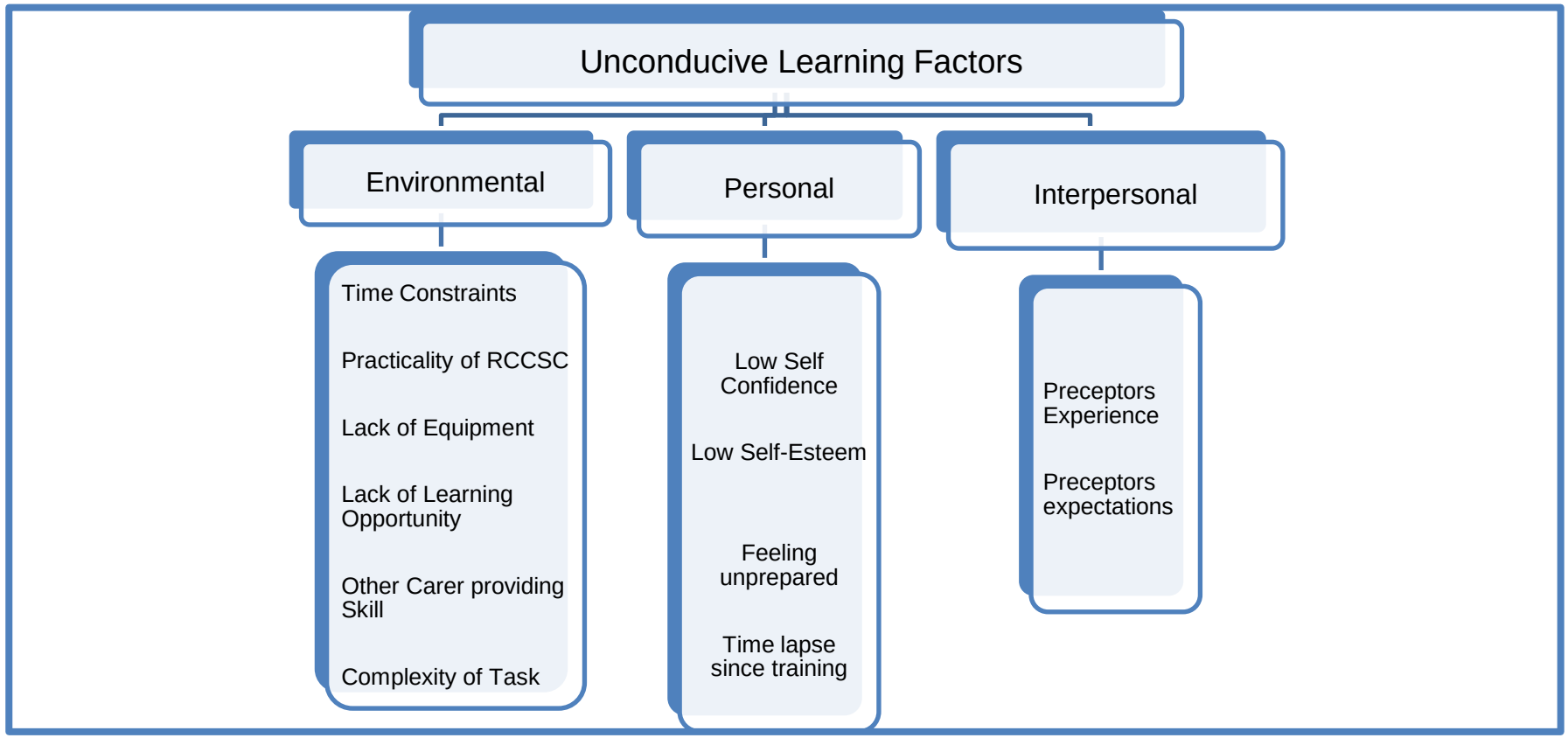


Figure 3: Theme 3 from the focus group: Unconducive learning factors



Appendix 25: Figures providing a visual presentation of the themes, categories and sub-categories identified from the analysis of the written reflective comments

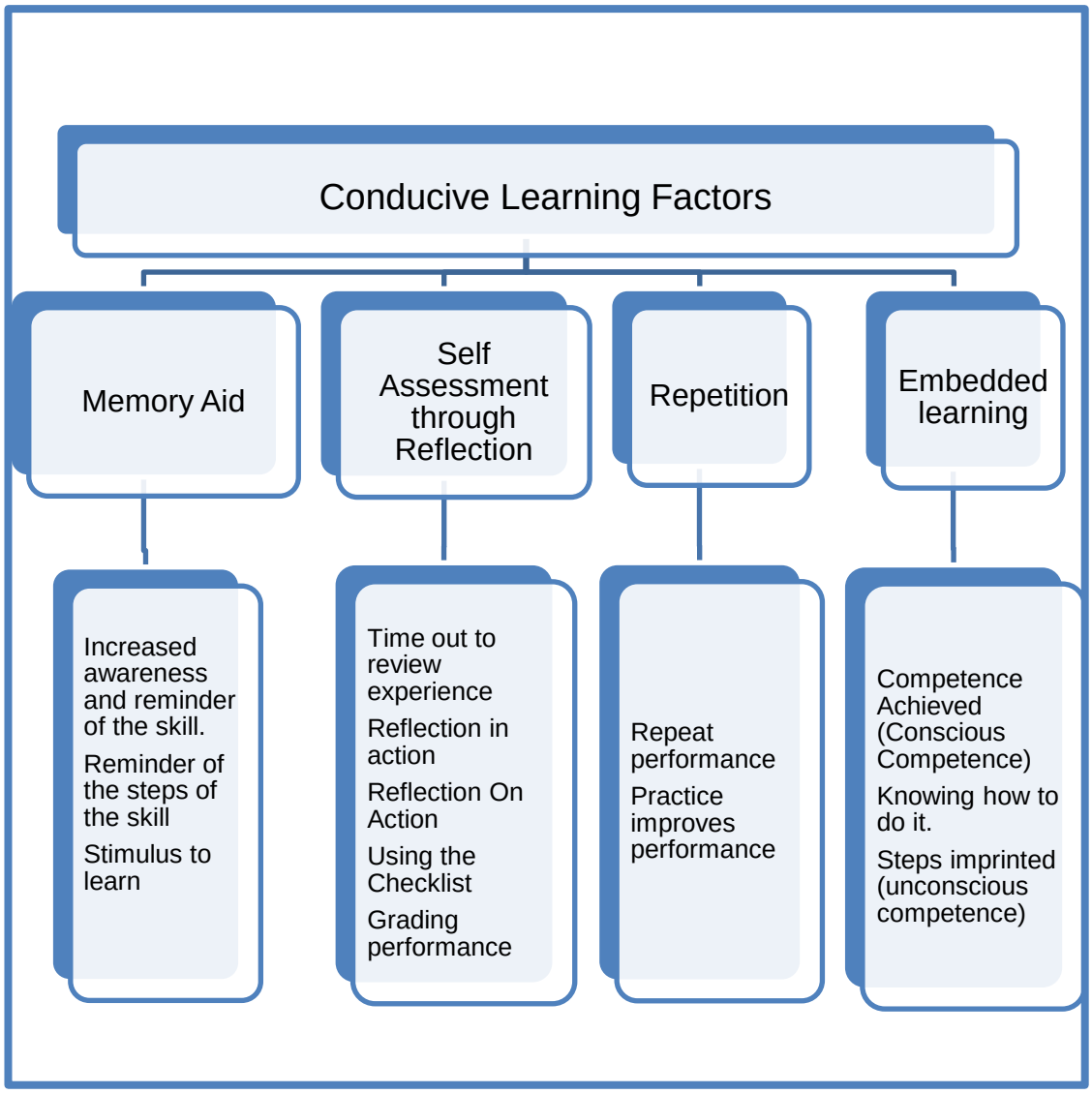


Figure 1: Theme 1 from RCCSC Reflective Comments: Conducive Learning Factors

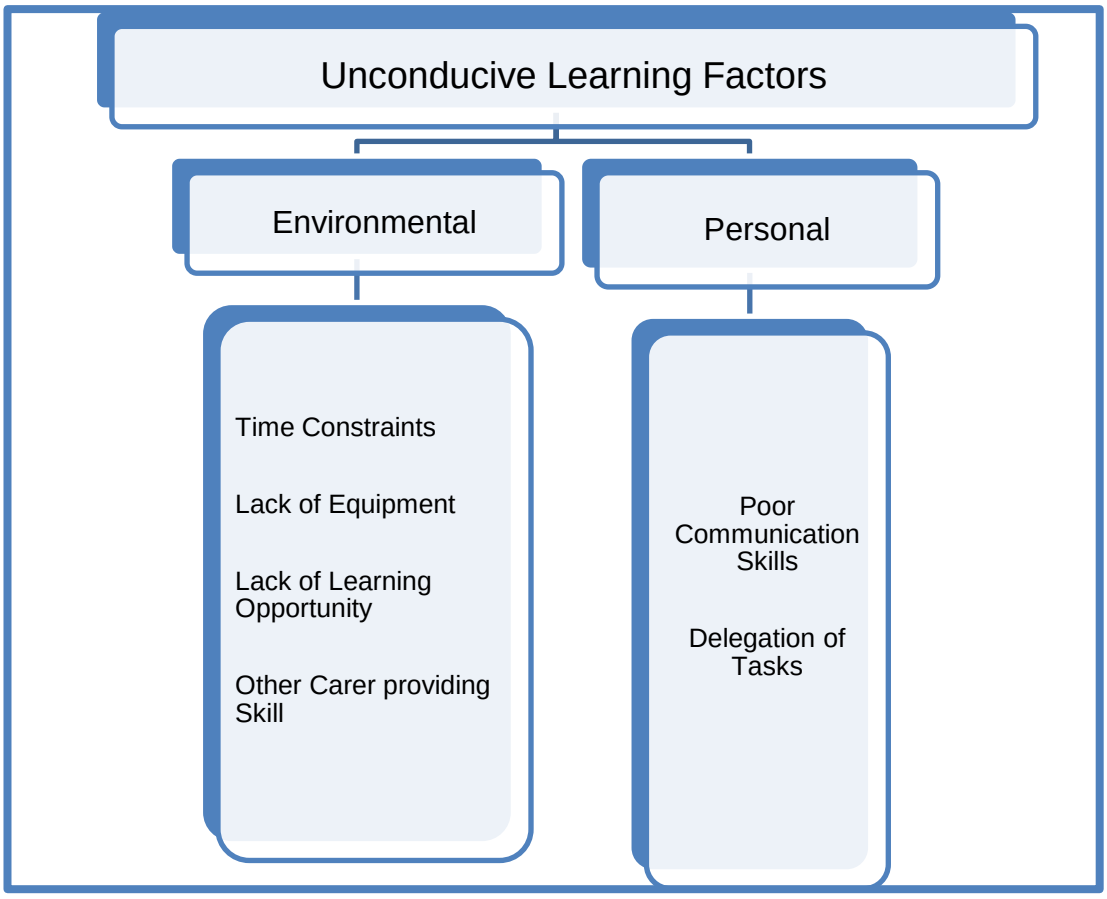


Figure 2: Theme 2 from RCCSC reflective comments: unconducive learning factors

Appendix 26: Formal Dissemination Activities

Jan 2010
New Horizons Post Graduate Research Conference
University of Derby

Nursing Students' Clinical Skills Competence: The Development of a Self-Rating Scale.

May 2010
2nd Doctoral Colloquium for Nursing Midwifery Health Sciences and Social Sciences
School of Nursing and Midwifery, Trinity College, Dublin

Using self-assessment to develop student nurses' clinical skills competence: A case study analysis

May 2011
Fourth International Clinical Skills Conference
Showcasing Innovation and Evidence-based Clinical Skills Education and Practice
Monash University, Prato, Italy

Using Self-Assessment to Develop Clinical Skills Competence in Undergraduate Nursing Students.

November 2014
15th Healthcare Interdisciplinary Research Conference.
Health Wellbeing and Innovation: recent advances in research, practice and education.
Trinity College, Dublin

The use of a Reflective Checklist for Clinical Skills Competence (RCCSC) to enhance the competence levels of undergraduate nursing students in Ireland; A mixed methods study.

October 2015

Three day workshop disseminating the results of the research at the University of Maribor, Slovenia and providing staff training to assist in the implementation of the educational approach used in this research to the Faculty of Health Sciences at the University of Maribor